# ARCHIVES OF OPHTHALMOLOGY.

## IRREGULAR ASTIGMATISM DUE TO THE USE OF THE MICROSCOPE.

By F. W. ELLIS, M.D., Monson, Mass.

PROBABLY many who work with the microscope have noticed a temporary blurring of vision in the disused eye, after the prolonged use of the instrument. The disturbance of vision is especially marked when the eye which is not employed is kept closed. Leroy [1] published observations, in 1889, in regard to this phenomenon. He found that the lessened visual acuity in the eye not employed in the microscopical observation did not depend on a lack of symmetrical accommodation, or upon ordinary astigmatism. He stated that there was always a monocular diplopia in the vertical direction, which he believed was due to some temporary mechanical change in the dioptric media.

The publication of Leroy occasioned an interesting note by Crispo [2] concerning the monocular polyopia due to microscopical work which he had observed upon himself. He stated that he was often obliged to use the microscope, and had the habit of always looking with his right eye, keeping the other closed. After a long observation, the vision of the left eye became indistinct. The blurring was so great that it was impossible for him to read. In order to read he was obliged to keep his left eye closed, and to read with his right. At first the visual disturbance disappeared after a few hours, but in time the condition became chronic. He was obliged to abandon his microscope for a while. At the time of writing, he stated that the polyopia had disappeared, but that the vision of the affected eye was still impaired. After

[1] *Comptes rendus de l'Acad. des Sciences.*

[2] "Note sur des Phénomènes de Diplopie d'Origine musculaire." *Archives de Physiologie*, 1889, p. 749.

a considerable time, he was able to resume the use of the microscope. He attributed his previous trouble to the muscular effort required to keep the left eye closed. In order to guard against a return of the affection, he made a screen of cardboard, attached to the microscope, cut in such a way that when either the right or left eye was employed in the observation, the other eye was covered with the screen. This simple arrangement enabled him to keep both eyes open, and to use them alternately; and succeeded to his satisfaction, as there was no return of the polyopia.

Cases similar to that of Crispo may be rare, but, no doubt, many have observed the temporary disturbance of vision which he and Leroy describe; the writer noticed it years before seeing any mention of it in print.

My interest in this subject has been recently renewed by an interesting case in my practice. A young physicist, recently returned from Germany, consulted me lately for double vision of his left eye. He finds the diplopia especially annoying in reading, and is not so mindful of it at other times. His right eye is emmetropic and has normal vision; the vision of the left is $\frac{20}{L.}$ When regarding the test-types, at twenty feet, with the right eye screened, he sees each letter well defined, accompanied by a fainter image displaced to the left. He first noticed the diplopia about three years ago, after steadily working with the microscope for six months, in some physical experiments. In these experiments he used his right eye exclusively, keeping the left closed. He had noticed nothing abnormal in the left eye before this time. He consulted a distinguished oculist in Germany for his trouble, but obtained no relief.

His vision was not materially benefited by any spherical or cylindrical glass. The Javal ophthalmometer indicated little regular astigmatism, but in revolving the mires their images became distorted in certain positions, indicating the irregular variety. With the retinoscope there was an irregular reflex and a peculiar play of light and shadow, explained by the irregular curvature of the cornea. The vision of the affected eye was much improved by looking through a narrow hole when the disc containing it was placed in a certain

position in front of the eye. The interesting feature of this case is that the irregular astigmatism was very probably caused by the prolonged pressure to which the eye was subjected in the protracted microscopical investigation. It seems highly improbable that the defect was congenital, as the patient had never noticed it previously to his exacting microscopical work, and has been greatly annoyed by it since. It has been noticed, with the ophthalmometer, by various observers, that even the pressure of the lids can affect the curvature of the cornea. Assuming that pressure of the lids was the cause of the irregular curvature of the cornea in this case, the habit which the patient had of closing the left eye in reading would seem likely to aggravate the trouble; I consequently prescribed a ground-glass screen to be worn in front of the left eye in reading, to prevent its closure.

The practical deduction to be drawn from this and the analogous case of Crispo is that, in prolonged microscopical work, the eye which is not used, especially if it be kept closed, is more likely to suffer than the one employed in observation. It would seem that there is a real danger in the exclusive use of one eye, for a long time, under such circumstances. Generally the deformation of curvature due to the abnormal pressure rapidly disappears, but it may be more lasting, or even permanent. It is undoubtedly well to cultivate the habit of keeping both eyes open while using optical instruments. Whenever there is inability to do this, a screen before the disused eye should be employed, if a blurring of vision is noticed after keeping the eye closed. The screen will enable both eyes to be kept open, by preventing confusion of images.

The irregular astigmatism due to the closure of the disused eye in microscopical work is probably due to the pressure of the lids. Geo. Bull[1] made a careful study of the effects of this pressure upon the cornea. His conclusion was that the disturbance of vision caused by constriction of the lids (*clignement*), such as occurs in the use of optical instruments,

[1] Transactions of the Eighth International Ophthalmological Congress, Edinburgh, 1894.

is due to horizontal striæ or furrows in the corneal epithelium. According to him, when the lids are constricted their edges are pressed against the cornea; and when this pressure is continued for some time, a more or less permanent indentation of the corneal epithelium results. These horizontal furrows act as concave cylinders, and accordingly, affect the clearness of vision by producing a monocular diplopia in the vertical direction. Bull's conclusions were drawn from the study of the entoptic images produced by regarding a small candle-flame 5 metres distant through a convex lens of 5 centimetres focus, held within 2 centimetres from the eye. According to him, the illuminated field of the image will exhibit a dark band for each furrow of the cornea. He also asserts that he has been able to demonstrate these transitory markings upon the cornea by means of oblique illumination, and by direct examination with the mirror of the ophthalmoscope.

It is easy to prove that the confused vision of an eye that has been kept forcibly closed during microscopical work is due to vertical diplopia. A horizontal wire held at some distance against a light ground will be seen clearly doubled by the affected eye, but a vertical wire in the same plane will have its normal appearance. In my own case it is not easy to produce the entoptic bands described by Bull as due to corneal depressions. I have many times obtained distinct vertical diplopia and confused vision without any appearance of dark bands in the entoptic images. The number of my experiments thus far is too limited to enable me to make any authoritative statements regarding the validity of Bull's conclusions. His work is very interesting and merits repetition. It is very easy to observe the bright and dark transitory bands in the entoptic images due to accumulation of fluid on the surface of the cornea, which are dispelled by winking, and the tigred or reticulated appearance due to pressure upon the cornea.

I hope that the subject of which I have treated may receive increased attention, and that microscopists and ophthalmologists who have noted deleterious effects from microscopical work, or have encountered cases similar to those I have mentioned, will report their observations.

# A CASE OF FILARIA OCULI HUMANI.

By JAMES W. BARRETT, M.D., M.S., F.R.C.S., Eng.,

SURGEON TO THE VICTORIAN EYE AND EAR HOSPITAL, MELBOURNE.

THE recent publication of a case of filaria reminds me of my neglect to place on record a similar case which I saw in December, 1893. The patient, a young man, had lived on the Gold Coast in Africa for some years. He left it four years before I saw him, and during that time he resided in Melbourne. Three days before presenting himself for treatment he felt something wrong with his left eye, and his friends then noticed a small thread-like object moving beneath the conjunctiva. This presently disappeared. Three days later I received a telephone message from a chemist to the effect that there was a man in his shop whose eye contained a worm which was moving about. The patient immediately visited me and I found the statement perfectly correct. In the upper part of the eye, and about four to six millimetres from the cornea, a white, thread-like object was seen moving in folds, the conjunctiva in the vicinity being irritated. The lids were at once retracted by a speculum and the conjunctiva and the worm seized with a pair of iris forceps. An incision was made with a pair of scissors and the worm was seized with another pair of iris forceps and gently drawn from the opening. It continued to move for some minutes after its extraction. The worm was about 1¼ to 1½ inches long and in bulk the size of a fine piece of string. Dr. Dendy examined it for me and pronounced it to be filaria, probably filaria oculi humani, but the details are unfortunately wanting owing to the loss of the specimen.

The patient said that such cases are common on the Gold Coast, and that the natives extract these worms with fine bone needles, one of which he produced for my inspection.

The striking feature about the case is the fact that this filaria had remained hidden, apparetly in some lymph recess or artificial sinus, for four years.

# A METHOD OF UTILIZING CICATRICIAL SKIN-FLAPS IN THE OPERATION FOR ECTROPIUM OF THE UPPER LID.

By Dr. F. C. HOTZ, Chicago.

*(With three figures in the text.)*

THE thin cicatricial skin usually found in the immediate vicinity of the completely everted upper lid is generally regarded as unsuitable for transplantation, because it is the general belief that scar tissue should not be included in skinflaps. We therefore find in all the different operations for ectropium of the upper lid the operators begin their operation with separating the lid from the cicatricial skin by an incision which is made closely along the lid border. By further dissection the lid is thus freed from all scar adhesions resisting its reposition; and when finally the lid is turned down in its normal position there is a large wound left extending from the lid border upwards to, or even beyond, the supra-orbital margin. This wound surface is covered either by a large skin-flap transplanted from the neighborhood if "good" skin can conveniently be had there, or by a large Wolfe's flap, taken from the arm; or by a number of Thiersch's grafts.

The use of flaps consisting of the entire thickness of the skin has the great disadvantage that their weight hinders the movements of the lid, and these movements are still further impeded by their thickness; for when the lid wants to slide back over the eyeball the thick skin-flap cannot fold itself, like the thin normal lid-skin, along the upper border of the tarsus to follow its movements. It therefore checks

these movements, and the result is a very incomplete opening of the eye.

These drawbacks are removed by the employment of Thiersch's grafts; the movements of the lid and its whole appearance being decidedly better and more natural.

But to all these methods the serious drawback is inherent, that the replaced lid is exposed to the traction of the shrinking tissues grafted upon the large wound, extending from the lid border to the eyebrows, and that there is always a possibility of a re-eversion of the lid border if this shrinking process should be very considerable.

Now, this disadvantage can be obviated if we take one flap just large enough to cover the lid surface only, and fix the upper margin of this flap to the upper border of the tarsus, and then cover the remaining wound above the lid by another flap or by Thiersch grafts. The firm union of the new lid-skin to the upper tarsal border interposes an insurmountable barrier to the traction of the tissues above the lid; the effect of their contraction is thereby restricted to the supra-tarsal region, and cannot affect the lid border. The shrinkage occurring in the small expanse of tissue which constitutes the new lid-skin is comparatively too inconsiderable as to disturb the position of the lid border.

I have in several cases operated according to this plan, and the results have fully sustained my expectations.[1] The general appearance and the movements of the lid were far more natural after this than after any other method. The skin-flap intended for the lid surface was cut out of the cicatricial skin surrounding the everted lid; and I found that these cicatricial skin-flaps make the best substitute for the lost lid-skin, and that, contrary to the general belief, they can be transplanted as successfully as flaps of normal skin. The operation can be employed in all cases in which at least a portion of the eyebrows has been destroyed. It is performed in the following manner: From a point (*a*, Fig. 1) near the inner canthus, an incision is made obliquely up-

[1] One of these cases was reported at the last meeting of the American Medical Association, held in Atlanta, May, 1896, and the excellent result of the operation was demonstrated by photographs.

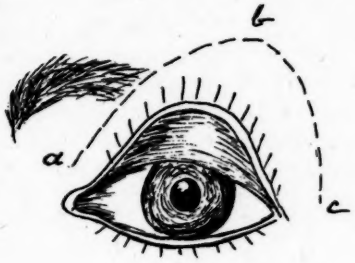



FIG. 1.

ward beyond the remaining hairs of the brow well up into the cicatricial skin of the supra-orbital region, and there continued at a considerable distance (*b*) from the lid border in a curve toward the temporal side, and then downward, to terminate at a point (*c*) about six millimetres from the external canthus. This incision outlines a large convex skin-flap (*a b c*), which is carefully dissected off from the underlying scar tissue, but is left connected with the lid border. Then the lid is released from the deeper scar tissue until it can be replaced in its normal position.

The cicatricial skin-flap (*a b c*) of course contracts considerably as soon as it is detached from its basis; but as this shrinkage has been anticipated by cutting the flap of very liberal dimensions, the contraction leaves it still large enough to cover the whole surface of the lid. It is spread out smoothly over this surface, and its margin (*a c*) is fixed to

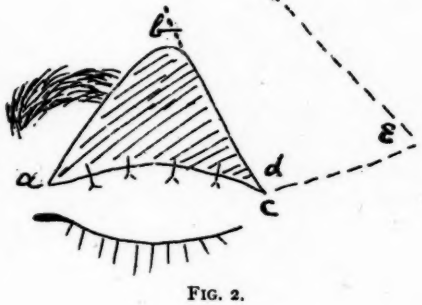



FIG. 2.

the upper border of the tarsus by four silk sutures. Into the wound (*a b c*) above the lid, a skin-flap (*b d e*, Fig. 2), which also may contain a great deal of cicatricial tissue, is transplanted, its margin (*b d*) being united with *a b*, and *d e* with the margin *a c* of the lid-skin. The small wound area remaining to the temporal side of this flap may be left to heal by granulation.

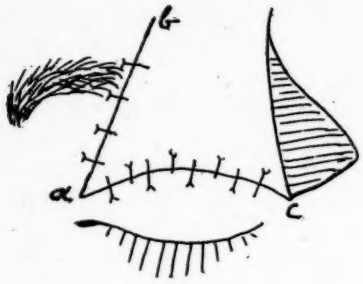



FIG. 3.

Instead of transplanting a skin-flap, Thiersch grafts may be used for filling the wound above the lid.

The advantages of this method are:

1. That the lid is supplied with a thin and light skin, which does not restrict its movements.

2. The skin-flap on the lid, being fixed to the upper border of the tarsal cartilage, is rendered independent of the supra-tarsal skin, and cannot be affected by the shrinkage of the latter.

3. No amount of shrinkage in the supra-tarsal region, therefore, can cause a re-eversion of the lid border, because the firm union of the lid-skin with the upper tarsal border makes it impossible that the contraction of the supra-tarsal tissues could affect the lid-skin and lid border.

4. It is not necessary to immobilize the lid for a number of days by sutures or ligatures, as in the use of Wolfe's or Thiersch's grafts.

# A CASE OF CONGENITAL COLOBOMA OF THE LENS.

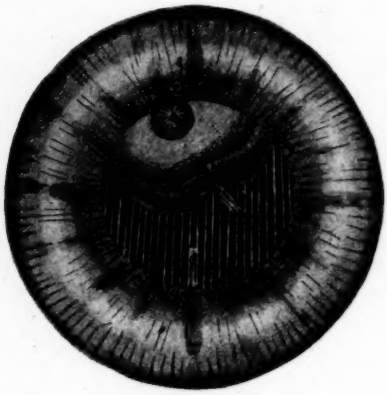
By JOHN DUNN, Richmond, Va.

(*With 1 drawing in the text.*)

Mr. S., aged twenty, was lately brought to me to obtain my advice as to the advisability of removing from the left eye "a cataract which had been first noticed when he was six months old." Examination of the eye revealed the following: O. S. divergent squint; no paralysis; vision, perception of outlines of objects; tension, normal; cornea, perfectly transparent, both to naked eye and under strong lenses; iris, tremulous, of dull, dirty-yellow color, contrasting thus markedly with the brown iris O. D., whose brightness was normal; pupillary reactions, normal; pupil, possibly a trifle more contracted than in O. D.; upper half or three quarters of the pupillary space showed behind it the whitish appearance of a cataractous lens; *the diameter of the cornea, and hence of iris, was from 1 to 2 mm. less than corresponding diameters O. D.*

Under atropia the pupil dilated fairly well; less, however, than what is termed complete dilatation; no adhesions between iris and lens capsule; in two places *pupillary membranes* were to be seen: one inferiorly, extending directly upward; the other *extended, from the centre of the coloboma in the lens, downward and outward*; the end which should have been attached to the iris had disappeared. The appearance of the lens varied under different methods of illumination. Viewed from behind a + 16 D lens placed in the ophthalmoscope, the lens resembled in shape the basal half of a heart, the reëntrant angle being directed downward and outward, and from this angle projected the bit of pupillary membrane above referred to. The lens could be seen to

exist only for about the upper half of the pupillary space; *extending from inferior border of the lens substance to and behind the inferior border of pupillary margin was a delicate membrane showing fine, vertical, parallel striæ very distinct.* The inferior border of the lens showed as a delicate water-line against the vitreous. From the inferior border upwards the lens substance became gradually thicker and appeared terraced as it were. For the lower two terraces the lens substance was transparent; the ascending surfaces of the terraces looked like dark lines when the flat surfaces were viewed from above. For the third terrace the lens substance became partially opaque, whitish, resembling an incompletely cataractous lens. The last terrace was totally opaque and under the +



16 D sph. lens it showed no marked peculiarity. Under a strong light concentrated by a + 20 D lens from the side, a + 30 D lens being held before the eye, the above appearances could all the more clearly be seen, while the opaque part of the lens showed distinctly as a shrivelled lens nucleus, upon whose surface was a minute speck of pigment. Between the inferior border of the lens and the pupillary margin, enough space existed to allow of examination of the vitreous and fundus below the level of the superior border of the disc. Optic disc was normal, save that temporally its outline was stretched, as it were, suggesting the idea of a slight coloboma. Vitreous normal. No hyaloid artery or remnants of a central canal visible. Vision not improved by dilatation of pupil, or by lenses. O. D. normal.

In the ARCHIVES OF OPHTHALMOLOGY, vol. xxv., No. 1, Dr. CHRISTEN reports three cases of congenital coloboma of the lens. In his article he calls attention to the fact that reports of but few cases of this anomaly have found their way into medical literature. It may not be out of place to compare the appearances found here with those present in the case of congenital aphakia, reported in the same number of the ARCHIVES in which Dr. Christen's article appears. In both cases the dull, dirty-yellow color of the tremulous iris is present. To what this peculiar appearance of the iris is due it is difficult to say. As far as one may judge, this condition of the iris at the age of 39 is the same as it is at the age of 20—the ages of the two patients. In one patient the vision is nothing; in the other there is perception of outlines of objects. In the former, as in the latter, the pupillary reflexes are normal. In the former, only incomplete dilatation of the pupil under atropia could be obtained; in the latter, the dilatation is more marked. It is a question whether, in the former case at the age of 20, the dilatation under atropia would have been greater than it was at the age of 39. In neither were there inflammatory adhesions. In both the cornea was perfectly transparent.

As we said above, the color of the iris in these two cases is characteristic. HIRSCHBERG has called attention to its existence in certain cases of congenital malformations of the eyes. The color is not the yellow-green seen from time to time in an eye the seat of cyclitis; nor has it the rough appearance of iris which has undergone atrophy. Christen, in his first case, says the iris was "slightly atrophic." Whether in my two cases this appearance of the iris was congenital, due to arrest of development, or to pre-natal inflammation; or whether it was due to incomplete further development after birth, the result of the absence, in part (Case 2) or whole (Case 1), of the lens, whereby was lacking one of stimuli to normal functioning of the iris, *i. e.*, the contraction and relaxation of the lens, I cannot say. Nor can it be certainly determined unless such an eye could be seen shortly after birth. The facts above stated in regard to the response of the iris to the action of atropine,

viz., the comparatively slight action in the case of complete aphakia, patient aged 39, and relatively much greater effect obtained in the case of the imperfect lens, patient aged 20, seems to point to this condition of the iris as one acquired after birth. If, on the other hand, in Hirschberg's cases the lens was present and normal (I have only an allusion to his cases at my command), then we must look upon this condition of the iris as congenital—a view I am inclined to take.

The persistence of the pupillary membranes in this case shows that nature found a flaw in the material supplied and left her work unfinished.

To account for the condition of the lens as above described, more than one hypothesis suggests itself. At first glance we might say we had a case of ectopia lentis, with the lens substance partially absorbed, partially transparent, partially cataractous. The present condition was noticed as early as the sixth month after the birth of the patient. The presence of the pupillary membranes and the peculiar place of attachment of one of their remnants, point to the fact that the causes of this anomaly must be sought in pre-natal conditions. The peculiar outline of the inferior border of the lens, the coloboma, points further to the condition as one of arrest of development. The lower and outer zones of the existing lens substance have remained transparent, a condition, I take it, we should scarcely expect to find at so late a date in a lens as much shrunken as this one, where the shrinking was due to injury. Again, it may be objected that if this case be not one of ectopia lentis, and the coloboma the result of unequal shrinking of the injured lens, how are we to account for the presence of the nucleus. The nucleus is to be considered, I think, as the nucleus of the part of the lens which developed, and not the displaced nucleus of a complete lens, which itself afterward became dislocated. That we have here to do with a partially cataractous lens must, most likely, be due to imperfect nutrition.

There is one other interesting feature in connection with this case. Is the membrane above mentioned, showing the

distinct striæ, and extending from the inferior border of the imperfect lens downwards behind the iris, a portion of the lens capsule or is it the zonula prolonged? Although it is continuous above with the lens capsule, it must, I think, be considered a prolongation of the zonula and not as lens capsule.

In the accompanying illustration, drawn by Dr. John W. Brodnax, of Manchester, Va., the striæ are relatively much more distinct than they appear under the magnifying lens. They, however, represent the existing condition fairly well.

# TRAUMATIC ENOPHTHALMOS DUE TO FRACTURE OF THE FRONTAL BONE; INSANITY; TREPHINING; DEATH.[1]

By JOHN B. ROBERTS, M.D.,

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On December 11, 1895, a man aged about forty-five years was kicked in the face by a mule. Lacerated wounds of no very great severity were produced in the left supra-orbital region and beneath the left eye. He was treated at a hospital for two weeks and then discharged with the wound healed. I believe that a diagnosis was made that the patient had sustained a fracture of the frontal bone in addition to the injuries to the soft parts.

I was called to see him in January, at the instance of Dr. B. R. Peltz, and examined him at his home. The patient showed signs of mental aberration, which were particularly marked at night. He talked intelligently, but made statements which the family said were untrue. The condition did not seem like the delirium of acute disease, but rather of the nature of insanity. Indeed, a physician, who saw him before Dr. Peltz, advised that he be sent to an insane asylvm.

The left eye appeared to be cmaller than the right. It was evident, however, that this was due to depression of the orbit and consequent sinking of the globe of the eye, which, being depressed, was not sufficiently prominent to keep the eyelids normally separated. This made the palpebral opening and eye appear small when compared with the normal side. The pupil was dilated and did not react to light. Ophthalmoscopic examination apparently showed a slight optic neuritis. The patient's vision in the left eye was markedly inferior to that of the right eye, but

[1] Read before the Section of Ophthalmology of the College of Physicians, March 17, 1896.

no refractive examination could be made at the time. There was ptosis, which did not seem to be due to the wound of the lid having damaged the elevator muscle, but to nerve injury. The wounds were all entirely healed. There was no motor paralysis of the arms or legs, but the fæces and urine were evacuated involuntarily. Nothing special was discovered in the heart and lungs, and the urine, examined a few days later, was normal.

Believing that the man was suffering from fracture of the skull which had led to meningitis and to possible cerebral abscess, I had him admitted to the Methodist Hospital for observation and probable trephining. The examination made at the hospital shows, according to the notes, that the patient had illusions and thought that he saw horses ; this evidently was due to the fact that his occupation required him to take care of a number of horses. He called strangers by the names of his friends. He especially warned me against driving a certain horse which he said was dangerous. He did not seem to be able to locate sensation acurately ; if he was touched upon the chin he located the sensation on the middle incisor teeth. When he was touched upon the hand, he said that it burned, and he did not seem to have normal cutaneous sensibility in the feet. When he was asked to read he would read a few words correctly, but made frequent mistakes. He was constantly in motion and talked with great fluency, but with appropriateness of accent and stress.

As has been stated, the left eye was enophthalmic. There was slight internal strabismus and ptosis, a dilated pupil which did not respond to light, and some opacity of the cornea at the inner and nasal quadrant. The papilla at this time, which was perhaps a week after my first examination, seemed whitish but not swollen. This observation, however, I was not sure of, because of the defective nature of the examination due to the difficulty of keeping the patient quiet and getting good light. I had the impression that the swelling from optic neuritis which I thought I observed at my first visit had subsided and that atrophy was beginning. There was a scar about half an inch long in the upper eyelid and supra-orbital region, and another on the cheek, below the outer canthus, running down over the malar bone. The patient was so uncontrollable that it was necessary to give him large amounts of potassium bromide, frequent doses of chloral, and to strap him to the bed.

A few days after admission, I etherized him and operated for

the purpose of removing any fragments of bone driven into the brain, or to evacuate an abscess that might be found present. I made an incision, convex downward, extending from the temporal ridge externally to the inner border of the nose, making a flap about 2½ inches long, with its base upwards. With an inch trephine and gnawing forceps, I cut away a portion of bone, somewhat triangular in shape, about two inches long and an inch and a half wide.

During this stage of the operation, I found that the supra-orbital ridge and orbital plate of the frontal bone had been fractured. The external angular process and most of the superciliary ridge were removed. These portions became loose, at the partially united lines of fracture, during my efforts to remove the button made by the trephine, and were taken out to give access to the fragments displaced towards the cranial cavity. There was no marked displacement of the supra-orbital portion or external angular process of the bone. I felt obliged, however, to remove this portion of the border of the orbit, because I felt that fragments were almost certainly imbedded in the dura or the brain itself. When the dura was exposed it was found to be thickened and dark red. Pressure upon it gave a peculiar crackling sensation, which made me believe that small fragments of bone were imbedded within its tissue. This proved to be the fact, for upon incising the dural surface a number of small fragments of the orbital plate were removed from the middle of the thickened membrane. It was evident that the orbital plate had been shattered and driven into the membranes of the brain.

A considerable portion of the orbital plate was removed. No particles of bone were found within the brain itself, which was found normal when the dura was laid open so as to expose the convolutions. A considerable amount of serous fluid escaped when the dura was incised.

As a result of the operation, almost the entire supra-orbital ridge and from one-third to one-half of the orbital plate of the frontal bone were removed. The removal of so much bone opened the frontal sinus, which was a complication that gave me considerable anxiety, for I felt that septic contamination was liable to occur from the sinus. I therefore packed the inner angle of the wound with a small amount of iodoform gauze in order that the major portion of the wound and the cranial contents should not become infected. The rest of the wound was closed with sutures and a gauze dressing applied.

The patient recovered from ether satisfactorily, and was much more quiet after the operation than before. He was treated with bromide of potassium. One or two days later, I removed the dressing; and withdrew the iodoform gauze strip which had been put in the inner angle of the wound to furnish drainage, if there was any occurrence of infection from the frontal sinus. The wound was uniting nicely and showed no evidence of infection.

Two days later the patient's temperature rose rapidly. I removed the dressing and found that the opening through which I supposed there would be drainage, though I had removed the gauze, had become closed; and there was a little fluid retained in the wound which caused bulging of the flap and prevented the pulsations of the brain being visible externally as they were when I had examined the wound before. I removed one or two stitches and allowed perhaps half a dram of serous fluid to escape.

From this time the patient's condition became worse, and it was evident that he was suffering from acute encephalitis. He became comatose, and died on the fifth day, notwithstanding the fact that I opened up the whole wound and tried to disinfect the tissues, which had evidently become infected by the retained fluid. It is, of course, uncertain whether the infection occurred from the retained fluid being infected from the frontal sinus, or whether the drainage track remained open sufficiently to permit infection from the corner of the eye. It was because this opening was so near the palpebral commissure and was liable to be infected from the inner angle of the eye that I felt constrained to remove the strip of iodoform gauze so early.

An *autopsy* showed that the dura over the front of the left hemisphere was generally adherent to the bone. My colleague, Dr. J. Hendrie Lloyd, was present at the autopsy; and I am indebted to him for the careful character of the examination. The membranes covering the cerebrum showed an area of meningitis, with effused blood, occupying the antero-frontal regions of the left hemisphere and extending from about the region of the ascending frontal convolution to the top of the frontal lobe, being in extent about two inches. The effused blood was most conspicuous in the posterior part of this area. The hemispheres of the cerebrum were agglutinated. This area was apparently a true hemorrhagic external pachymeningitis.

On reflecting the dura, there was found an extensive area of purulent leptomeningitis over the fronto-parietal regions of the left side. This seemed to be due to a local infection by con-

tiguity sub-adjacent to, but extending more widely than, the pachymeningitis. The vascular sheaths in this region were full of pus. The dura, which was thickened, was adherent over part of the area. The leptomeningitis extended almost to the vault, but the longitudinal fissue was not involved. The other lobes and the substance of the whole brain appeared to be normal. The purulent process was confined to the pachymeningitis and sub-adjacent leptomeningitis already described.

# DESCRIPTION OF A FEW OF THE RARER COMPLICATIONS OCCURRING DURING AND FOLLOWING CATARACT EXTRACTION.[1]

By CHARLES A. OLIVER, A.M., M.D.,

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THE belief that the few following experiences, which have been gathered together out of a number of less interesting observations of the same character, might be of some interest to the medical profession, and the hope that the methods adopted to immediately relieve the unexpected conditions here encountered, might prove of some value to other observers situated under similar ciruumstances, have been the inducements to the writer to place the present series on record.

In every case the acme of good result was obtained by prompt and careful attention to conditions that if left alone would have most probably led to disastrous consequences.

CASE 1.—*Breakage and loss of point of von Graefe knife in the path of the wound of counterpuncture; subsequent uncomplicated simple extraction with almost normal vision; successful simple extraction in fellow eye.*

On the 4th of May, 1894, the writer whilst making the counterpuncture for the extraction of a mature cataract in a fifty-two-year-old man, found that, even with sufficient force to show a distinct bending of the portion of a narrow von Graefe knife that was in the anterior chamber, it was impossible, without doing considerable damage to the organ, to complete the cut. Upon the

[1] Read before the April, 1896, meeting of the Section on Ophthalmology of the College of Physicians of Philadelphia.

withdrawal of the knife, about one half a millimetre's length of the end of the blade was found to be missing.

The aqueous humor was allowed to re-acumulate, and the tip of the knife could be plainly seen through the corneal membrane, imbedded in the scleral tissue. Attempts at removal, with both a strong magnet and a pair of fine iris forceps introduced through an opening made directly over the position of the knife tip, failed, without the probability of inducing severe traumatism, to secure the foreign object. Atropine was instilled and the eye was lightly bandaged. Very little reaction, and only that which was produced by the efforts to remove the piece of steel, took place.

On the 14th of September of the same year, a smooth simple extraction through a corneal incision, so made as to avoid the position of the foreign material, was made by the writer. A slight prolapse of the iris, which was readily reduced by eserine and pressure, appeared on the third day. The after-treatment was uneventful, and corrected vision rose to nearly normal.

On the 18th of September, 1895, the fellow lens, which came away in its capsule, was successfully delivered by a simple extraction made under cocaine anæsthesia, as was done with the previous operation. Corrected vision with this eye also became, almost, if not quite, normal.

At present writing, nearly two years later, the eye with the minute fragment of steel imbedded in the sclera, is perfectly quiet, and vision is as good as before.

CASE 2.—*Dislocation of crystalline lens into the vitreous chamber far up and back of the ciliary body; recovery and delivery with a peculiarly shaped wire loop; perfect result.*

On the 23d of October, 1891, the writer made a smooth corneal incision and a clean upward iridectomy as the first parts of an operation to remove a hypermature cataract in a sixty-three-year-old man. Upon incising the toughened capsule with a cystotome, an almost fluid, gelatinous-like material escaped into the anterior chamber. At the same time, the nucleus and the capsule were dislocated so far up and back of the ciliary body that they could not be seen. A wire loop, so bent that the extremity was curved at a right angle to the shank of the instrument, was gently carried in in such a manner that the nuclear and capsular mass fell down upon the concave surface of the wire. Careful downward, followed by gentle upward and outward, traction brought the mass

through the corneal incision, leaving a clear pupil; the procedure being complicated only by the loss of a few drops of vitreous. The iris edges were entirely freed and the corneal wound was thoroughly cleansed.

The wound was closed on the following day and recovery was undisturbed.

CASE 3.—*Modified simple extraction; spontaneous expulsion of crystalline lens into the air with the loss of but a few drops of vitreous humor; recovery with normal vision.*

On the 14th of February, 1894, during an extraction with peripheral iridectomy, just after making the capsulotomy, and whilst the eye was untouched, the patient, a man, suddenly and without apparent cause, became so unruly that he closed the lids violently over the eye and as quickly opened them, when the lens was forcibly shot over his head upon the pillow beyond, just as if it had been driven from a toy gun; this was followed by the loss of a few drops of vitreous humor. The operative field was carefully cleansed and the eye was closed by a pressure bandage.

Upon the third day the corneal wound was united and the anterior chamber reëstablished. The small clean iridectomy in the radial fibres, with the bridge of iris tissue, including the sphincter pupillæ between the original pupil and the coloboma, was plainly visible. Upon the evening of the fourth day, a sharp iritis appeared, though it rapidly yielded to leeching, atropine, and ice compresses. In a few days all reaction ceased, and the eye, with its double pupil, quickly recovered.

CASE 4.—*Simple extraction in an unruly patient; spontaneous ejection of lens into the air without any loss of vitreous humor; prolapse of iris on the fifth day, with incipient localized iritis; uninterrupted recovery with round pupil and almost normal vision.*

On the 8th of January, 1894, but five weeks previous to Case 3, a similar complication occurred. The patient, a seventy-five-year old man, after having had the operation for simple extraction carried without accident as far as getting ready for the delivery of the lens, suddenly squeezed the lids together. This untoward act was immediately followed by the ejection of the greater part of the lens over the patient's head, falling upon the pillow just back of his ear. The operation was continued and the toilet was completed as though nothing had happened.

On the fifth day, in spite of eserine and bandage which had

been used upon account of several threatenings, the iris bulged out of the incision in the cornea for several hours. Four days later, by reason of a slight discoloration of the upper-inner part of the iris tissue, and the appearance of a couple of faint synechia in the position of the iris that had been prolapsed, atropine was substituted for the eserine. The pressure bandage was continued. In five days' time, the corneal wound was firmly closed. The iris was of good tint, the pupil was round and easily dilated, and the anterior chamber was thoroughly re-established.

Complete recovery rapidly ensued, and vision, properly corrected, rose to almost normal, and has remained so.

CASE 5 —*Ectropium, lachrymal obstruction, and senile cataract; modified Dieffenbach and Bowman's operations, resulting in the cure of the ectropium and the relief of the lachrymal symptoms; cataract extraction; evacuation of aqueous humor from the anterior chamber by unexpected movement of patient's eye; operative procedure temporarily postponed and lens extracted without accident; lids forced down upon eye by patient, producing a prolapse of the iris and the vitreous; excision of protruding portions, obtaining a free iridectomy and a clean corneal incision; recurrent hemorrhages from iris tissue; recovery with good vision.*

In this case, occurring in a seventy-year-old man, at the completion of the puncture with a very narrow von Graefe knife, the patient suddenly turned his eye inward, enlarging the corneal wound and evacuating the anterior chamber. After bandaging the eye, and waiting an hour or so, thus allowing the re-formation of the aqueous humor and the partial dilatation of the pupil, the anterior chamber was entered by a broad von Graefe knife through the same wound of entrance, and a well-curved flap, situated just within the corneal limbus, was secured. The capsule of the lens was freely incised with a cystotome and the lens gently delivered by the aid of two spatulas without loss of vitreous, leaving a clean round pupil.

After the instruments had been removed and preparations were being made for the toilet of the operation, the patient, suddenly and without warning, forcibly contracted the lids down upon the eyeball and forced out about half a drachm of fluid-vitreous, causing the iris to prolapse. A clean cut and well shaped coloboma of the iris was secured by two cuts with the iris scissors passed through the oozing vitreous, and a broad bead of vitreous

was quickly snipped off with an extremely sharp pair of iris scissors. The edges of the wound were carefully cleansed and the eye was evenly and smoothly bandaged with a flannel roller.

In two days, the 20th of September, 1893, the corneal wound was healed, and there was some blood in the anterior chamber. On the following day the use of atropine was commenced. On the fourteenth day a small isolated vascular and painless nodule appeared in the iris upon the upper-outer edge of the coloboma. Careful examination showed that this nodule was a blood cyst formed between the endothelium and the substantia propria of the iris. In nine days the blood gradually disappeared and the nodule flattened, allowing a faint secondary cataract to be seen. A second hemorrhage, this time from the outer pillar of the iris, which became absorbed in two weeks, took place.

The after-history was uneventful and careful correction gave an excellent acuity of vision.

CASE 6.—*Extraction with iridectomy; wound healed in twenty-four hours and reopened the third day by an accidental blow from an attendant's elbow; reunion of incision, with subsequent attainment of normal vision.*

On the 18th of March, 1895, a perfectly smooth extraction with iridectomy in a sixty-year-old woman did well, and remained free from all irritation until an attendant, who was resting for a few minutes in bed alongside of the patient, inadvertently raised her hands over her head and struck the operated eye with her elbow. The wound opened and gaped and was occupied by a small blood clot. Atropine was instilled, the eye was firmly bandaged with a flannel roller, and the patient was placed in bed.

In a few days the wound firmly united, when active treatment was gradually reduced and discontinued in two weeks. Later, corrected vision became normal.

CASE 7.—*Extraction in capsule with narrow iridectomy; accidental injury to eye on second day with recurrent hemorrhages from iris tissue; recovery with nearly normal vision.*

On the 8th day of June, 1892, for necessary reasons, the writer removed an immature cataract from a sixty-five-year-old man. A broad incision with a narrow von Graefe knife, made sufficiently wide to allow an easy egress of the lens during delivery, was made. A broad horizontal cut in the upper part of the capsule was obtained with a cystotome. The lens was gently delivered

and found to be entirely covered with its capsule. The wound surface was irrigated. No loss of vitreous took place.

Upon the morning of the second day, an attendant, whilst dressing the eye, accidentally knocked his hand against the organ, and broke open the corneal incision, producing sharp ocular pain and the formation of recurrent blood clots in the anterior chamber. Ice compresses upon pressure bandages, rest in bed, and atropine soon relieved the conditions.

A correcting lens brought the vision to nearly normal.

CASE 8.—*Uncomplicated simple extraction; imperfect closure of corneal incision with leakage of aqueous humor; forward displacement of the iris with annihilation of the anterior chamber; commencing iritis with formation of anterior synechia; breakage of synechia with restitution of pupillary space; perfect result.*

On the 14th of November, 1895, the writer did a smooth and uncomplicated simple extraction upon a healthy man of seventy-nine years of age. Without apparent reason and with the most judicious care, the wound failed to heal and the anterior chamber remained open. On the fifth day, two minute anterior synechiæ situated just at the pupillary edge determined the employment of mydriatics. Scopolamine in $\frac{1}{4}$ per cent. strength was freely though carefully used in conjunction with firm pressure. These, with unirritating flushings with boric acid solution, soon broke several fine flat and a few string-like synechiæ, allowing the iris to fall into its proper place, the pupil to become practically round, and the corneal wound to firmly unite.

A subsequent capsulotomy for a faint though disturbing secondary cataract brought vision to normal.

CASE 9.—*Simple extraction of hypermature cataract in a sixty-two-year-old woman suffering from recurrent mania; post-operative insanity; good result.*

On the 6th of April, 1894, the writer removed a hypermature cataract without any accident from a sixty-two-year-old woman by simple extraction. The cortex was degenerated into a milky-white fluid. The corneal wound was healed on the third day.

Upon the morning of the third day the patient became maniacal and tried to tear the dressings from her eye. She was somewhat quieted by the hypodermatic use of hyoscine. During the night of the same day, she endeavored to take her life by jumping out of the window, but was prevented by the prompt assistance

of an attendant. Subsequently, she tried to smother herself in a small closet. In spite of these circumstances, which later were unceasingly guarded against, the eye made an excellent recovery. It was afterward learned from her family that years previously she had had recurrent attacks of mania.

REMARKS.—Careful consideration of these cases will show how important it is to thoroughly and quickly appreciate the best course of action to be taken during such emergencies.

The inability of immediate recognition of the unexpected condition or dilemna; the merest tittle of difference of opinion of what next best to do; the slightest hesitancy in planning how to endeavor to get rid of any disturbing factor; and the want of knowledge how at times to make an error or a fault subserve an useful purpose, must all show, by the recital of experiences of others, how important information regarding such accidents as these must be when the time of emergency appears.

As each operator finds himself face to face with a complication that he has never heard of or that he has never had the privilege to have seen before, such empiricisms as given in this article, it seems to the writer, must have some worth and use: in this spirit the present communication is given.

# THE PNEUMOCOCCUS OF FRAENKEL AS A FREQUENT CAUSE OF ACUTE CATARRHAL CONJUNCTIVITIS.

By H. GIFFORD, M.D., Omaha, Neb.,

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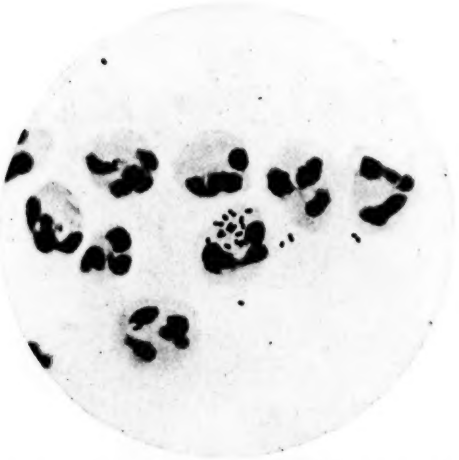
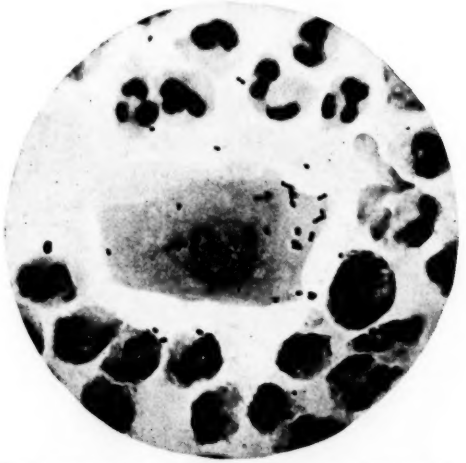
(*With 2 micro-photographs.*)

ACCORDING to Weeks, acute catarrhal conjunctivitis is, in New York, caused almost exclusively by the small bacillus which he was the first to study thoroughly; and his observations have been confirmed, to a large extent, for Paris and vicinity, by Morax and Beach. Now, since I regard the results of these gentlemen as entirely trustworthy, it is with considerable hesitation that I have brought myself to state that, for Omaha and vicinity, their conclusions do not hold. On the face of it, it would seem decidedly improbable that such an affection should, in Omaha, be caused, as a rule, by a different germ from that causing it in New York and Paris; yet such is the conclusion to which a study of the disease, extending over eight years, has brought me.

This acute conjunctivitis so commonly gets well without treatment, that in a community like this, where the dispensary nuisance is still in its infancy, but a very small proportion of the cases are ever seen by a physician, to say nothing of an oculist; consequently, while I constantly hear of numbers of cases, I have only been able to examine carefully about forty (mostly binocular) during the eight years; but as each of the great majority of these was one of quite an epidemic of similar cases, it is, I think, putting it mildly to say that they represent at least two hundred cases with the



Secretion from acute pneumococcus-conjunctivitis x 1000.
Photographed by Dr. Wm. Gray, Washington, D. C.



Secretion from acute pneumococcus-conjunctivitis x 1000.
Photographed by Dr. Wm. Gray, Washington, D. C.

same etiology. In all but four of these the discharge was found by the microscope to contain, generally in large numbers and in a state of purity, not the bacillus of Weeks, but the pneumococcus of Fraenkel (otherwise known as the diplococcus lanceolatus, micrococcus Pasteuri, etc.), and cultures on serum and agar-serum, which I have made from twelve of these cases, have shown the same germ, almost always in a state of purity. Moreover, I have carried the disease from eye to eye by means of the discharge, finding in the discharge from the inoculated eyes the same germ, exclusively or nearly so; and finally, with pure cultures of the third generation, have caused the disease in man; thus completing the chain of evidence required to establish the pneumococcus as the exciting cause.

The first to publish any account of this germ as a probable cause of conjunctivitis was Morax (*Thèse de Paris*, 1894), who, in his excellent thesis, describes four cases from the clinic of Parinaud, in which the secretions contained the pneumococcus of Fraenkel in great numbers, as shown by the microscope and by cultures. The patients were all young children, and the disease was monocular. Later, in the same year, Parinaud (*Annales d'Oculistique*, Dec., 1894) describes a form of conjunctivitis, occurring in new-born infants, accompanied by coryza and lachrymal obstruction, in which the microscope and culture tube showed the secretions to contain great quantities of the pneumococcus.

Gasparini (*Annali di Ottalmologia*, xxiii., Fasc. 6) describes six cases, two of them in infants, four in adults, where the pneumococcus seemed to be the cause of a catarrhal conjunctivitis; and in a second paper (*Annali di Ottal.*, xxiv., Supplement, and xxv., Fasc. 1) he cites additional cases, some of them with serious corneal complications. He has also found the pneumococcus alone in cases of ophthalmia neonatorum in which the symptoms led him to expect to find the gonococcus; also in a number of cases of exacerbations in trachomatous eyes. Gasparini, while admitting the priority of Morax's paper on the pneumococcus conjunctivitis in infants, claims, with entire justice, that he was the first to ascribe to the disease its real importance as a

contagious binocular affection, attacking adults as well as children.

In none of the foregoing articles is any mention made of attempts to cause catarrhal conjunctivitis in man or the lower animals, nor of attempts to carry the disease from eye to eye in man.[1] In a recent paper by Axenfeld, however (*Aerztlicher Verein zu Marburg*, 1895; reported in *Centralblatt f. Augenheilkunde*, Feb., 1896), a school-epidemic of pneumococcus conjunctivitis is described; and mention is made of unsuccessful attempts to convey the disease to man, with the secretion from the infected eyes, as well as with cultures of the germ. He regards the disease as essentially one of childhood, and suggests that, while many clinical facts speak strongly for its contagiousness, it may be that climatic conditions so influence the ordinary pneumococci of the respiratory passages, that a number of eyes are attacked by them independently, at about the same time.

Uthoff and Axenfeld (*Arch. f. Ophthalmologie*, xlii., i., 1896), in the course of their article on infectious keratitis, mention a single exceptional race of pneumococci which in rabbits cause a peculiar localized grayish-red thickening of the conjunctiva, not at all like a catarrhal conjunctivitis, however.

The clinical picture of the pneumococcus conjunctivitis is, in brief, a red, watery, uncomfortable eye, with some puffiness of the lids; a rather profuse muco-purulent, stringy discharge; with the conjunctiva of the folds generally only moderately swollen, the ocular conjunctiva congested, often with thinly spread out hemorrhages beneath it. From this average there is much variation in both directions; often the symptoms are much less pronounced, but, rarely, they

[1] In Gasparini's earliest paper on the pneumococcus in the pathology of the eye (*Anuali di Ottal.*, xxii., p. 332), in which he describes it as occurring in a large proportion of normal conjunctival sacs, mention is made of inoculation of the conjunctiva of rabbits, by injecting cultures of the pneumococcus under the conjunctiva and by introducing the germ into the sac after scarifying the conjunctiva. The result of both procedures was a marked local reaction, with an abundant muco-purulent secretion. At this time Gasparini had not observed this germ as a cause of conjunctivitis in man, and as I can find no reference to these experiments in his later papers on pneumococcus conjunctivitis, he apparently lays no great stress on them. With such methods of inoculation similar results might be expected from the use of any of the pyogenic germs.

are so severe, the swelling of the lids is so great, and the discharge so profuse that gonorrhœal ophthalmia is suggested. Or more often, on account of the swelling of the retro-tarsal folds, a suspicion of acute trachoma may be raised. I have never had an opportunity of comparing it with the conjunctivitis caused by Weeks' bacillus, but Gasparini, who has, can find no well marked clinical distinctions between the two, though he refers to the fine pellicle of fibrin which can be wiped off from the everted upper tarsus in pneumococcus conjunctivitis (which I also have often observed) as something which he has not met with in Weeks' conjunctivitis. The period of incubation, as I know for reasons hereafter to be explained, is generally forty-eight hours; and the symptoms reach their height within a day or two after the appearance of the first symptoms, then, as a rule, subsiding, even when no treatment is employed; so that the eye is well within a week or sooner after the beginning of the disease. It occasionally happens, however, that the disease assumes a chronic form and drags along for several weeks or until proper treatment is employed. The corneal lesions described by Gasparini, I have never met with. If the first eye does not receive prompt treatment the second eye is, in my experience, almost invariably infected; but I have obtained the impression, as Gasparini has, that the inflammation of the second eye, aside from the effects of earlier treatment, runs a milder course; though I admit that this is a point upon which one is very liable to be deceived. For checking the inflammation, I find a collyrium of chloride of zinc (gr. j., ad ℥ j.) very efficient, though I have met with a few cases where the lids had to be everted and the solution applied directly to the folds, before the disease could be cured. A microscopic examination of the discharge, in an average case, at the height of the inflammation, shows an abundance of diplococci generally with well marked capsules; the single members in typical forms being very slightly elongated, but not all sharp-pointed as the average description of the pneumococcus would lead us to expect; some single cocci are seen and some that at first appear like short bacilli, but these, on careful focussing, can

almost always be resolved into a pair of cocci. The germs are frequently found in the pus corpuscles and occasionally in epithelial cells. Usually only a few germs are found in a single cell, but one sometimes finds cells stuffed with them to their utmost capacity. Generally no other bacteria are to be seen, and in cultures, as a rule, a pure, or nearly pure, growth of the pneumococcus of Fraenkel is obtained. As a cultivating medium, I have found either blood serum, serum-agar, or bouillon to answer well; on agar or glycerine-agar the colonies either do not develop at all or are so fine and transparent as to be hard to locate. On gelatine I have never obtained any growth of the germ.[1] In making cultures from the secretion it does not do simply to transfer a bit of the secretion to the surface of the culture medium and expect a development to occur from its edges, for, as a rule, none is observable under these conditions; but if the secretion be dragged over the surface of the medium with the aid of a platinum wire which has been touched to it while hot, the trail of germs thus left behind results in a development of well isolated and characteristic colonies. In cultures, the germ as obtained from the conjunctival secretion exhibits the characteristics usually ascribed to the pneumococcus, it dies out very rapidly and varies considerably in form. Beside the chain-form, commonly obtained when it is cultivated in bouillon or liquid serum, there occur on solid media a number of unusual and bizarre forms; large sharply pointed ovals; diplococci of which one member is small and round, the other large and oval; also rods of varying breadth, with more or less pointed ends,—these all occurring in cultures of unquestionable purity. The best description and figures of these forms that I have found are in the paper of Uthoff and Axenfeld (*loc. cit.*) on infectious keratitis. Tested on rab-

[1] Perhaps if I had spent more time in trying different degrees of alkalescence for my agar and gelatine, I should have had better success with them; but other observers have also had negative results with gelatine, and at times with the most carefully prepared agar. Beside serum and serum-agar, I have found an excellent solid medium for the pneumococcus in a mixture of ordinary agar with an equal quantity of sterilized, alkalinized, highly albuminous urine, as recommended by Hammer (*Deutsche Med. Wochenschrift*, 51, 1895), for growing the gonococcus.

bits, these cultures from the eye show very little virulence; in fact, from subcutaneous injections I have obtained no appreciable reaction. As before mentioned, on agar I have obtained either no growth at all, or a very slight one, under ordinary conditions, but, strangely enough, if a mixture of the pneumococcus and a sarcina (probably S. lutea) is used, an abundant growth of both germs occurs on the agar; and in these mixed cultures the pneumococcus retains its vitality much longer than it generally does when grown alone.

Generally speaking, the more pronounced the symptoms, the greater the abundance of pneumococci in the discharge. In very mild cases it is sometimes well to use Gram's method of staining, in order to discover them more easily (in these cases also, other germs are more apt to be found); though when they are abundant, staining with dilute corbol-fuchsin gives the most characteristic pictures. When the inflammation begins to abate, whether naturally or from treatment, the number of pneumococci in the discharge becomes rapidly less; so that, in the later stages, they are often hard or impossible to find.

Most observers describe the pneumococcus conjunctivitis as essentially a disease of childhood, and I have no doubt that more cases of it occur in childhood, owing to the greater facilities for the spread of epidemics in schools, orphan asylums, and other public institutions; but aside from this, I agree with Gasparini that the disease occurs fully as often in young adults as in children. The oldest patient that I have had with a typical case (from natural causes) was a woman of thirty-five; the youngest, a child of about nine months.

PROOF THAT THE PNEUMOCOCCUS REALLY CAUSES THE DISEASE.—Hitherto the status of pneumococcus conjunctivitis has been similar to that of the gonorrhœal inflammations before the inoculations of Bumm. The presence of the germ in large numbers and in a state of purity in the conjunctival discharges made it altogether probable that it caused the disease, but the final link in the chain of evidence, the production of the disease in man or the lower animals by pure cultures, has been wanting, and even the possibility of direct contagion from eye to eye has never been proved,

although, from the epidemic character of the disease, it was highly probable. This gap in the evidence I am now able to fill.

First, with regard to the contagiousness of the disease, let me adduce the following experiments:

EXPERIMENT I.—On September 15, 1893, J. C., aged ten, was brought to my office with typical, double-sided pneumococcus conjunctivitis. I took a bit of the discharge from the lower cul-de-sac with a platinum wire and introduced it into the outer corner of my right conjunctival sac. On awaking the next morning there was a slight sense of discomfort about the eye, which soon passed away, and nothing further abnormal was observed until the second morning, when the lids were puffy and tightly stuck together, the conjunctiva, both palpebral and ocular, much congested with an abundant discharge. These symptoms continued to increase for the next twenty-four hours, when, upon the use of the zinc chloride collyrium, they abated, and in three days more the eye was as well as ever. Examination of the discharge with the microscope showed numerous pneumococci, and in cultures made upon ½ per cent. agar a sparing, pure growth of the same germ was obtained.

EXPERIMENT II.—A bit of the discharge taken from my own conjunctiva on the second day of the disease was introduced into the conjunctival sac of the right eye of my assistant, Dr. Overholt, resulting, after a lapse of forty-eight hours, in an attack of pneumococcus conjunctivitis in his eye also. The symptoms in his case were much lighter than in mine, and began to subside on the second day without any medicine being used. No cultures were made from his eye, but the microscope showed the pneumococcus in the discharge, though much more sparingly than in my case.

It is not every one, however, who is susceptible to the influence of the conjunctival form of the pneumococcus, as is evident from Axenfeld's negative results; and one attack of the disease seems, in some cases, to exercise an immunizing influence on the affected conjunctiva, for I have, since, twice tried to convey the disease to my right eye, without success. This immunity is not indefinite, however, for my

infant daughter has had the disease (from natural causes) twice in both eyes within a space of two years.

INOCULATIONS WITH PURE CULTURES.—The results of my first attempts to reproduce the disease with pure cultures of the pneumococcus were no more successful than those of Axenfeld. Cultures on blood serum, serum-agar, albuminous-urine-agar, and on human blood serum were tried without effect; and this was not altogether surprising, considering the well known readiness with which nearly all forms of the pneumococcus lose their virulence.

EXPERIMENT I.—April 15, 1896. Finally, however, I made an anaërobic culture of the third generation, by Büchner's method, on serum-agar, and after twenty-four hours, while the growth on the solid surface was as scanty as usual, there was a very thick deposit of the germs in the condensation water. I removed some of this with a sterilized pipette and dropped two small drops into the lower conjunctival cul-de-sac of W. S., aged twenty-three, with a normal conjunctiva. The next morning (*i. e.*, after twenty-two hours) the eye was much inflamed, revealing the typical appearance of acute catarrhal conjunctivitis with numerous pneumococci and no other germs in the secretions, as tested by serum-agar cultures and by the microscope. On the next day the swelling of the lids and the discharge were increased, and the discomfort caused by the eye was so great that I gave the patient (whom I had bribed to allow me to use his conjunctiva) the usual zinc chloride collyrium; this he used for several days, probably not very thoroughly, with some improvement at first; but then, in spite of its use, the discharge and swelling got worse again, so that on the eighth day after the inoculation the inflammation was as bad as ever. On this day I again examined the secretion from the eye and found it to contain immense numbers of the pneumococci, which also grew in a pure culture on serum-agar. At this time the upper retrotarsal fold was so rough and swollen that any one seeing the case for the first time would have been inclined to diagnose trachoma, but on making two or three applications of the zinc solution directly to the folds, the inflammation promptly subsided. While this patient's eye was inflamed, he played with his nephew, aged nineteen months, and within a few days the latter developed an acute catarrhal conjunctivitis, and in the discharge from his eyes I found the pneumococcus in pure culture. This case,

however, ran the ordinary course and recovered after one application of zinc.

EXPERIMENT II.—March, 1896. A single small drop of the same fluid as that used in the preceding experiment was put into the lower cul-de-sac of the left eye of M. M., aged forty-three, who had had an acute attack of trachoma about a year before, and whose conjunctiva was slightly hyperæmic. The next day the eye showed no decided change in appearance, but on the second day it presented the usual picture of a well marked pneumococcus conjunctivitis; but although there was nothing unusual about the appearance of the discharge or the swelling of the lids, the microscope showed the pneumococci in smaller number than usual with so sharp an inflammation, and, in addition, quite a number of staphylococci. The culture also showed, beside numerous colonies of pneumococcus, more numerous colonies of the staphylococcus albus. This case yielded promptly on the use of the zinc collyrium.

These positive results with an anaërobic culture are in accord with the experiments of Kruse and Pansini (*Zeitschrift f. Hygiene*, xi., 1892), who found that the pneumococcus retains its vitality, and presumably its virulence, much longer when it is grown without free access of oxygen; but whether such results can, as a rule, be obtained I cannot say. In a second series of inoculations made with an anaërobic culture which I allowed to stand for a number of hours longer than in the preceding cases, I obtained one negative result and two positive ones; but in these two, the inflammation was very slight and transient, appearing, in one case, after forty-eight hours, in the other after seventy-two hours, and practically ceasing in the course of the next twenty-four hours. In each of these cases the microscope showed moderate numbers of characteristic pneumococci in the discharge, but no cultures were made from either of them.

With regard to the period of incubation, it should be noted that, while in the two cases caused by inoculating with the secretion, and in one of the light cases caused by a culture, it was nearly forty-eight hours, in the case of W. S., who received two drops from the anaërobic culture, it was less than twenty-four hours, while in that of M. M., who

received only one drop from the same culture it was about forty-eight, and in the second light culture-case it was seventy-two hours; thus indicating that, while, on the average, the period of incubation is about forty-eight hours, it varies with the quantity and virulence of the germs introduced.

One question, naturally suggested, is, whether the germ which causes this form of conjunctivitis is an especial ocular variety of the pneumococcus, or whether this germ, as it inhabits our mouths and respiratory passages (or as Gasparini claims, in a large proportion of cases, the normal conjunctival sac), is capable under the proper conditions of assuming the power to cause a conjunctivitis, just as it may cause a pneumonia. The fact that so many epidemics are caused by it without the serious implication of any membranes except the conjunctiva would suggest the existence of an especial ocular variety of the germ. But while such a variety may exist, many facts speak for the production of conjunctivitis by the ordinary varieties of the germ. My cases have occurred much more frequently during the winter and early spring, the period at which the pneumococcus is most apt to attack the respiratory passages. In the great majority it has not been preceded by any decided nasal trouble, but in a few it has, and in these the evidence of direct contagion has generally been wanting, the affection apparently having arisen *de novo*. For instance, my daughter has had two attacks, the conjunctivitis in each instance being preceded by slight symptoms of a cold in the head with a decided general reaction, which we were inclined to consider to be due to the grippe; and in neither case had there been any chance, that we knew of, for contagion, either of the conjunctivitis or the grippe. A few days after the beginning of her second attack, my son, aged four, developed a pneumococcus conjunctivitis without having any decided cold. In another family that I know, one of the children took cold and then had a conjunctivitis, following which, two other children in the family came down with conjunctivitis, without having any colds. I examined only one of these cases, but found it to be a typical pneumococcus case. This indicates how different epidemics of the disease may origi-

nate entirely independently of one another. I frequently hear of cases occurring during or shortly after attacks of the grippe. I have not yet been able to examine the secretion in any of these cases, but if they, too, should turn out to be caused by the pneumococcus, it would indicate either that the latter takes advantage of the favorable circumstances produced by the grippe to cause a conjunctivitis, or, what I think is not at all unlikely, that many of the cases commonly called the grippe are really cases of pneumococcus invasion, instead of being caused by the influenza bacillus.

I have stated that in four of the forty cases of catarrhal conjunctivitis which I have studied carefully I did not find the pneumococcus. In one of these I found what may have been the bacillus of Weeks, but I only took a hasty glance at one of the microscopic specimens, and before I got time to examine them carefully they were lost; while in the cultures everything was overgrown with a larger bacillus, which I have not studied farther. In the other three cases different germs were found, of which I may be able to give some report in the future. Their occurrence is interesting as indicating the many different sources from which an acute catarrhal conjunctivitis may be derived. The streptococcus conjunctivitis of Parinaud and the staphylococcus conjunctivitis of Gasparini I have not seen, nor have I come across the diplococcus which Wilbrand, Saenger, and Staelin (*Jahrbücher d. Hamburg. Staatskrankenanstalten*, iii., 2, 1891–92) describe as figuring so prominently in a conjunctivitis epidemic in Hamburg.

To sum up: (1) By far the most frequent cause of acute catarrhal conjunctivitis, in Omaha and vicinity is the pneumococcus of Fraenkel. (2) The writer has been able to prove that this pneumococcus variety of the disease is directly contagious, and may also be caused by pure anaërobic cultures of the germ. (3) It is by no means, as has been stated, a disease of childhood, but is quite common among young adults, and occurs at least as late as middle life.

# A CASE OF PARALYSIS OF CONVERGENCE WITH REMARKS.

By M. STRAUB, Utrecht.

Translated from vol. xxiii. (1891), p. 274, of *Archiv für Augenheilkunde*, by Dr. Ad. O. Pfingst, Louisville, Ky.

THE following case of paralysis of convergence which recently came under my observation may prove instructive.

The patient, a man of thirty-nine years, when seen for the first time in 1885, had defective vision of the right eye. V = $\frac{1}{6}$. At present (December, 1890) the V is the same. With + 2.0 D $\subset$ + 1.0 D ax. vert. it is brought up to $\frac{6}{6}$. Left eye is emmetropic. V = $\frac{6}{6}$. In October, 1889, the patient began to see objects double, followed two days later by drooping of the right upper eyelid. The report of the attending physician at the time shows that there was a paralysis of the right internal rectus muscle, followed shortly afterwards by ptosis, and finally by paralysis of all the branches of the oculo-motorius. The pupils were unequally dilated. Under the employment of mercury and iodide of potash, all of these symptoms had disappeared by December, 1890, with the exception of paresis of the rectus internus.

The examination at that time showed no diplopia, when objects were held at two or more metres from the eye, even though the fixed object was moved to either side. Two metres represented the maximum of convergence. Upon advancing the object (streak of light of Landolt's dynamometer) closer than 2 *m*, the position of the eyes remained unchanged, but crossed diplopia was produced. It was present in every part of the field. The pupillary reaction was restored. The near point of accommodation was at 12.5 *cm* in L and at 17.0 *cm* in R eye.

The field of fixation, measured with the perimeter, showed an amplitude of 50° to either side for both eyes. This was reached with a little difficulty with the right eye, owing, perhaps, to the amblyopia or preceding paralysis. In fixing objects at 5 *m* distant with one eye, the other or screened eye deviated outwards several degrees. Upon fixing near objects (45 *cm*), the right eye deviated 13.0° and the left 10.0°. If upon removing the screen from the covered eye it was quickly placed before the other, the former attained its position of fixation by an oscillating movement.

A prismatic action of 2° could be overcome in the vertical direction; likewise an abducting prism of 6° and an adducting prism of 12°. This would indicate a convergence near point of 2.5 *m*, a little more than was shown by direct estimation.

Finally, I may mention that the principal symptoms, such as amblyopia, dizziness, and headache, would immediately disappear when the weak eye was covered with a dark plate.

We have had to deal with complete paralysis of the oculo-motor nerve, which slowly disappeared, leaving a paresis of convergence. This remained to a marked degree, showing a manifest convergence of but ½ *m*. The innervation of associated lateral movements was intact. Although there was no history to indicate a central lesion, the outcome of the paralysis of the oculo-motor nerve, in paresis of convergence, leaves no doubt as to the central location of the primary trouble. A strange feature of the case was that the defect of associated movements should follow a lesion of one side.

The attention of ophthalmologists and neurologists has but in recent years been called to the isolated paralysis of convergence.

Schweigger[1] reported two such cases in 1881. Later Parinaud[2] reported five, and A. Graefe[3] ten cases.

Parinaud has classified the symptoms as follows:

1. The abolition of convergence and the appearance of diplopia.

2. Paresis or paralysis of accommodation. It is the exception for the accommodation to remain unaffected.

[1] Schweigger: *Klinische Untersuchungen über das Schielen.*
[2] *Brain*, ix., p. 330, 1887.
[3] Intern. Ophth. Congress zu Heidelberg, 1888.

3. The abolition of the pupillary reaction of convergence, the reaction to light remaining.

In our case, Nos. 2 and 3 of these symptoms were not present, which, I am inclined to believe, ought not be classified among the symptoms of paralysis of convergence. This is especially true of paralysis of accommodation. As to the derangement of the pupillary function, it should be our first object to determine if either the convergence or the accommodation cause a contraction of the pupil or if both do so. We know that contraction of the pupil takes place during their combined activity. My case would indicate that the contraction of the pupil is associated with accommodation but not with convergence.

Stölting and Bruns,[1] Benzler,[2] and Peters[3] have reported cases in which the symptoms corresponded with those found by Parinaud. It is true that in their cases paralysis of accommodation was a frequent complication of paralysis of convergence, nevertheless it cannot strictly be classified as a constant symptom of the same. A. Graefe also, in classifying the symptoms of paralysis of convergence, did not consider the changes in accommodation or pupillary action. He laid particular stress upon the examination with prisms. He believed in eliminating the possibility of an abnormal tension of the abductors having produced the symptoms.

The degree of paralysis varies some. In three of Parinaud's cases, diplopia was present at any distance. The near point of convergence in one of the cases was at 4 *m*, and in the other at 1.5 *m*. In Benzler's case it was at 6 *m*. In these cases, as in mine, the facultative convergence, as estimated with prisms, is retained.

Graefe included light paresis in his ten cases.

We should consider separately the lighter and the severer forms of paralysis, both as regards the symptoms and the etiology. In the mild cases there is sufficient convergence for ordinary purposes, but it takes the entire strength of the muscle to attain it. A weak prism would be sufficient to

[1] *Arch. f. Ophthalm.*, Bd. xxxiv., 3.
[2] *Deutsche Militär-aerztlt. Zritschrift*, Bd. xviii.
[3] *Centrb. f. pract. Augenheilkunde*, xiii.

cause diplopia. In the severer cases diplopia is always marked, as soon as the fixed object is within several metres of the eye. The mild forms may be produced by several conditions. They may be brought on by fatigue of nervous or debilitated individuals (Parinaud); by disease of the central nervous system (tabes—Landolt and Hübschner,[1] de Watteville[2]); by retarded movements of the globe, caused by the large eye of myopia, or by other unknown causes. We are hardly justified in applying the term paralysis to most of these cases. The severer forms of paresis—those bordering on paralysis—most likely have a focal origin. We would naturally suspect the lesion to be in the centre of the oculo-motor nerve, which lies beneath the third ventricle and the aqueduct of Sylvius, especially since Kohler and Pick have shown that the centres for accommodation and pupillary reaction are in the immediate vicinity of the centre for the internal rectus muscle.

Anatomical examinations will have to prove whether paralysis of convergence is produced by a lesion in these centres, or whether the lesions are at a more remote point.

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[1] Landolt: *Refraction and Accommodation of the Eye*, 1885, p. 504.
[2] *Neurolog. Centralblatt*, vi., 1887.

# REPORT OF A CASE OF PARALYSIS OF CONVERGENCE WITHOUT IMPAIRMENT OF ASSOCIATED MOVEMENTS.

By HENRY W. HAYNE, Lawrence, Kansas.

SO isolated and complete a paralysis of convergence without impairment of associated movements of the eyes has, so far as I am able to learn, never been reported. As there are so many peculiar features connected with the case, and the cause so obscure, I have been asked to publish it. The history is this:

October 16, 1895. Dr. Morse sent to my office Miss W., aged seventeen, with instruction that I should take her refraction, and if necessary prescribe the proper lenses, as she had been a constant sufferer with headaches, both frontal and temporal, for the past nine months, and eye strain had been diagnosed. She is a well developed girl with dark hair and eyes, and apparently in robust health, with family history good. She is a close student and graduated from the high school at fifteen, and entered the university without having any eye strain, and always enjoyed good health.

A careful examination without a mydriatic showed the following condition: V $\frac{20}{20}$ for each eye, which was not improved by glasses. Abduction, 12°; adduction, 4°; exophoria, 3°. Homatropine hydrobromate was prescribed, but as that failed to control accommodation three drops of a 4 gr. sol. of atropine was instilled, one drop the same evening and two the following morning when the examination was begun. The ophthalmoscope revealed nothing unusual except a moderate flushing of both discs, which somewhat invaded a well marked physiological cup. No error of refraction could be detected by that instrument. She accepted,

however, R. + 0.25, + 0.25 ax. 90; L. + 0.50, which raised her visual acuteness to $\frac{20}{20}$. Retinoscopy showed the left eye slightly over-corrected in all meridians. Her full correction was ordered to be worn constantly, and she was told to report in one week. At that time her visual acuteness had risen in each eye to $\frac{20}{15}$ both with and without glasses, with no cessation of the headaches, which would be brought on at any time by reading or sewing ten minutes. There was now no flushing of either disc. Abduction and adduction being the same, prisms 8°, total, in frames were ordered and she was taught to use them (Dr. Gould's method) twice daily at home, and to report at the office each day. Iodide of potassium and the bitter tonics were also prescribed at that time. Under the treatment she gradually improved until November 1st, when adduction was 10°, abduction 6°, with the same exophoria of 3° remaining. Abduction and adduction were always measured before the exercise was taken. I could frequently run her "convergence stimulus" adduction up to 35° in a few minutes without any discomfort whatever, and she felt encouraged as her symptoms seemed less severe. November 2d she presented herself, complaining of headache of more than usual severity. Her adduction had dropped to 0°, the red glass produced diplopia at 20 ft., and she had exophoria, 3°. She was also found to have a divergent alternating squint which produced diplopia for all objects nearer than one metre; could detect no reduction in the mobility of either eye in any direction, and the amount of deviation remained the same in all portions of the field. She could follow the finger moving rapidly from side to side without any apparent trouble, but instantly the finger was stopped, diplopia supervened. Tests were made in all nine positions, but in none of them was there any change in the diplopia, neither was there any tilting of the false image. There was no ptosis, pupillary reaction normal both to light and accommodation. Amplitude of accommodation 9½ *cm* or about 11 *D.* for each eye. All gymnastics were now discontinued and she was told to call every day at the office, which she did, as I wished to study the case. The point of maximum convergence gradually receded until a candle in a darkened room at 20 feet was clearly seen double which was corrected by a 1° prism base in. Up to November 15th neither her family physician nor myself had been able to assign any cause for the failure, when a conversation developed the fact that about November 1st, while

passing through the coal shed, she received a severe bump on the top of her head against a heavy beam. As near as she could locate it, she received the blow on the median line at the posterior border of the frontal bone. At this time, nothing unusual could be detected in that locality. While the blow was very painful at the time, she did not consider it of any bearing in the case, and had never mentioned it to me. Thinking we had arrived at a solution of the trouble, she was told that nothing could be done for her at present, but to wait patiently, that those cases frequently recovered spontaneously. All the symptons continued up to December 6th, when her eyes were again put under atropine and continued two weeks, which caused a cessation of the headaches but did not relieve her squint. Another examination showed her glasses to be correct. An analysis of the urine showed it to be normal, except that the reaction was alkaline. The microscope showed no casts. Her general appearance was that of a well nourished person in perfect health. The near tests were all made at 18 inches, the centre plane being taken about 15° below the horizon where there is crossed diplopia corrected by a 5° prism; but if the prism is allowed to remain, the eyes drop out until there is nearly the same deviation. Her correction was now run down $\frac{3}{4}$ *D.*, she was stimulated with strychnia and given exercise by looking at an object brought from beyond to within the point of maximum convergence. This exercise treatment was continued with some improvement until April 1st, when prisms $\frac{1}{4}$° were substituted for the dot and card, and she was treated with electricity, using the faradic current once daily. Up to the present, June, '96, all treatment has failed to relieve either the diplopia or her headaches, which are brought on by any near application of the eyes.

All reported cases have at some time shown a paralysis, or paresis, of accommodation, pupillary reaction, or the levator palpebræ. The cause in Dr. Straub's case[1] was clearly syphilitic, and it is not difficult to see how a lesion located near the oculo-motor nucleus might, and probably would, involve all bundles of fibres which pass to the eye within the trunk of the third nerve. In this case we have also normal pupillary reaction to light. We are taught

[1] See the preceding article in this number.

that the nerve fibres which pass from the retinæ through the optic tract, also pass to the same locality where are located the centres of convergence, accommodation, etc. If this is a fact, it is hard to see how all the other centres should escape and this one be so completely destroyed. As to the origin being traumatic, I do not believe so slight a blow could cause so complete a paralysis; and too, all the symptoms except the diplopia existed previous to the blow on the head. I conclude, therefore, that the accident and the failure were merely coincident. The impairment of vision was probably due to the congestion manifested by the flushing of both discs, which disappeared in a few days, when her vision promptly rose to the normal. I have not been able to explain so high a degree of abduction with so low a degree of exophoria; neither have I been able to explain the persistent headaches. In Dr. Straub's case, covering one eye removed all the disagreeable features. In my case it has proved of no benefit.

# CORNEAL MEASUREMENTS AFTER THE EXTRACTION OF CATARACT.

By ADOLPH O. PFINGST, M.D., Louisville, Ky.,

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IN selecting glasses for the aphakial eye, after the extraction of cataract, it is not an easy matter to decide just how much of the corneal astigmatism, which is always present in a higher or lower degree, should be neutralized with glasses.

We know that in the majority of cases the addition of a cylinder to the spherical lens improves the vision. As the cornea gradually resumes its original or almost original shape by the contraction of the cicatrix, the cylinder glass frequently ceases to be of benefit. To avoid the expense of a new glass after this contraction has taken place, we are, and especially in hospital practice, often called upon to prescribe at once the lens which we consider best for ultimate use.

To get an approximate idea of the changes to be expected in the amount of astigmatism in the first months after the extraction, a large number of cases would have to be examined. As the entire amount of astigmatism in the aphakial eye lies in the cornea, these examinations can best be made with the ophthalmometer, by means of which we can, even in the highest grades, come within 0.5 to 0.75 of the real amount.

It has long since been shown by measurements that the shape of the cornea is altered to quite a degree by the section of a cataract extraction, the vertical meridian becoming flatter.

Of the several factors which cause this flattening, Weiss,[1] who has studied this subject, has attached most importance to the displacement of the corneal flap. The cornea, in a great number of cases, when released from the sclera by virtue of its elasticity, becomes flatter and overlaps the fixed or scleral lip of the wound. This displacement in an exaggerated form gives rise to what is called the "riding flap." This condition causes a high degree of astigmatism.

Another factor in the production of astigmatism, and one which I consider equally as important as the displacement of the flap, is the interposition of scar tissue between the cut surfaces. The sanguineous exudation of the first few hours soon becomes replaced by spongy new connective tissue and blood-vessels, which lift the flap and consequently cause flattening of the cornea. Weiss[2] has demonstrated that without displacement the presence of the intercalary substance would tend to increase the curvature of the cornea.

Less important factors in the flattening of the cornea are said to be the thickening of the surroundings of the wound through cellular infiltration and retraction of the superficial lamellæ of the cornea.

After a well performed operation the astigmatism is usually regular, its axis depending upon the direction of the section. The greater curvature will naturally be at right angles to the section. All grades ranging from one to twenty dioptries have been found to exist.

One of the first to make measurements of the cornea after extraction was Haase. I was unable to secure his publication which appeared in the *Klin. Observ. in der Augenheilanstalt zu Wiesbaden*, vol. iii. The earliest reported cases which I was able to find were those of v. Reuss[3] and Woinow, who examined twenty-three eyes. The astigmatism, two months after the operation, ranged from 1.0 to 6.5 D.

Laqueur,[4] in a number of cases published in 1884, found astigmatism ranging from 1.0 to 16.0 D.

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[1] Weiss, *Arch. of Ophth. and Otology*, vol vi.
[2] *L. c.*
[3] v. Reuss and Woinow, *Ophthal. Studien über den astig. nach der Staaroperation*, Vienna, 1869.
[4] Laqueur, *Arch. für Ophthalmol.*, xxx.

The most recent researches in this direction were published in 1889–90 by Chimemi[1] in an extensive article. He also found higher grades than v. Reuss and Woinow. Among his ninety-five cases there were quite a number in which there was more than 10.0 D of astigmatism.

The contraction of the cicatrix causes a rapid diminution of the astigmatism, the greatest change taking place in the first three or four months. With the view of following these changes, and in the hopes of furnishing an aid to the selection of glasses, I have, during my service at the New York Ophthalmic and Aural Institute, made a number of measurements. The cases, which were operated with a flap section at the corneal limbus with a v. Graefe knife, were all taken from the practice of Dr. H. Knapp, to whom I hereby express my gratitude for the privilege of this publication. Although there was a much larger number of cases at my disposal, I was obliged to dispense with many of them for divers reasons. Many of the patients could not stand the light sufficiently long after two weeks to allow an examination, while others were unable to fix the barrel of the ophthalmometer. In a few a redundancy of the upper lid covered half of the cornea, hiding the images.

The measurements were made with the ophthalmometer of Javal by the light of a large window. I proceeded as follows: After bringing the eyes to the proper height and on a level so as to correspond with the axis of the instrument, I proceeded to get the primary position. The central lines of the mires were, in other words, made continuous. The arc upon which the mires are mounted was then moved through ¼ circle (90°), during which the images separated. The radius of curvature of the horizontal meridian was indicated on the arc by the movable mire. This mire was then advanced towards the stationary one until the images of the mires touched, when the radius of curvature of vertical meridian was noted. The difference between the two would represent the amount of astigmatism,[2] which for simplicity's sake I will express in dioptries.

[1] Chimemi, *Annales di Ottal.*, 1890.
[2] Burnett, *A Treatise on Astigmatism*, p. 129.

The first examinations were made two weeks after the extraction. The patients were examined again when they came for the secondary operation, two to eight weeks later. After that it was very difficult to get them to report at the hospital, so that the large number dwindled down to a few. I was able to examine a number after three to four months, but only four reported after the sixth month. Those patients which I did not get to examine after their discharge from the hospital (eighteen in number) I will enter under a common number (Nos. 42–59).

We see from the subjoined table that there is but a small percentage of cataract patients in whom ophthalmometric measurements are possible before the operation. The cataract has usually developed so far in the other eye as to make the fixation very uncertain. I have recorded only those cases in which the patient was able to centre his eye upon the barrel of the instrument. As the physiological astigmatism represents but a small amount, we may assume that the result obtained after the operation represents almost the entire change in the form of the cornea. At any rate, the number which I could examine before the operation is too small to give an idea of the influence of the existing astigmatism upon the final curvature of the cornea. A small amount of astigmatism with the rule would, no doubt, be the most favorable condition for a perfect cornea. Strange to say in the single case in which there was a high degree of astigmatism before the operation (4.5 D) considerable deformity (8 D) was found after two weeks, which after six additional weeks had only diminished 2.0 D, (case No. 34).

My examinations, made fourteen days after the extraction, show all grades of astigmatism varying from 1.0 to 22.0 D. In one case (in a patient who previously had 0.5 D. w. R), I found 1.5 D *w.* R. at the end of this time. Though it is the exception for the vertical meridian to be more curved than the horizontal so soon after the operation, a number of similar cases have previously been reported. Quite a number of the cases showed a change of over 10.0 D which has brought our average up to 7.7 D. The high grades were nearly all in eyes where the healing had taken

## A.—CASES WITH COMPLICATED HEALING OF WOUND.

* = extraction with iridectomy ; w. R. = with the rule ; ag. R. = against the rule.

| No. | Astig. before operation. | Astig. 2 wks. after operat. | Astig. 6–10 wks. after operat. | Astig. 4–6 mo. after operat. | Astig. 6–10 mo. after operat. | Remarks. |
|---|---|---|---|---|---|---|
| 1 | 1.0 D. w. R. | 9.5 D. ag. R. | 6 wks. 3.5 D. ag. R. | 6 mo. 2.5 ag. R. | | Slight incarceration of iris in middle of section. |
| 2 | 1.0 D. " | 10.0 " | | 4½ mo. 2.0 " | | Iris drawn upwards, and slight adhesion to middle of section. |
| 3 | —— | 18.0 " | | | | Prolapse of iris, abscised 14 hours later. |
| 4 | —— | 13.0 " | | | | Prolapse of small bead of vitreous. Small incarceration of iris. |
| 5 | 1.75 D. w R. | 12.0 " | | | | Patient ruptured wound three times. Adhesion of iris to middle of section. |
| 6 | —— | 17.0 " | | | | Large incarceration of iris in middle of section. |
| 7 | 0.75 D. ag. R. | 6.0 " | | | | Prolapse of iris, abscised 8 hours later. |
| 8 | 0.5 D. w. R. | 12.0 " | | | | Iris adherent to middle of section. |
| 9 | —— | 22.0 " | 6 wks. 1.90 ag. R. | | | Iris adherent to section in its entire extent. |
| 10* | 0.5 D. w. R. | 7.0 " | 8 wks. 6.5 " | 6 mo. 6.0 ag. R. | | Incarceration of column of iris in wound, on nasal side. |
| 11 | —— | 12.0 " | | | | Prolapse of iris, abscised 12 hours later. |
| 12 | —— | 17.0 " | 9 wks. 9.5 " | | | Adhesion of iris in entire length of wound. |
| | | 155.5 | | | | Average 12.9 D. |

## B.—CASES WITH UNCOMPLICATED HEALING OF WOUND.

| No. | Astig. before operation. | 2 wks. after. | 6–10 wks. | 4–6 mo. | 6–10 mo. | Remarks. |
|---|---|---|---|---|---|---|
| 13 | 0.5 D. w. R. | 7.0 D. ag. R. | 10 wks. 3.0 ag. R. | 6 mo. 1.5 D. ag. R. | 10 mo. 1.5 ag. R. | |
| 14 | —— | 2.5 " | 6 wks. 2.0 " | 4 mo. 1.75 w. R. | 10 mo. 1.75 w. R. | |
| 15 | Em. | 6.0 " | 9 wks. 2.0 " | 4 mo. 1.25 ag. R. | 6½ mo. 1.25 ag. R. | |
| 16 | 0.75 w. R. | 4.5 " | 8 wks. 2.0 " | 5 mo. 1.5 " | 7 mo. 1.5 " | |
| 17 | —— | 3.5 " | 8 wks. 1.25 " | 6 mo. E. | | |
| 18* | —— | 11.0 " | 7 wks. 3.0 " | 6 mo. 1.0 ag. R. | | |
| 19 | —— | 3.5 " | 9 wks. 2.5 " | 6 mo. 1.75 " | | |
| 20 | 0.5 w. R. | 8.0 " | 6 wks. 2.5 " | 4½ mo. 2.0 " | | |
| 21 | 3.0 w. R. | 3.5 " | | | | |
| 22 | E. | 7.5 " | 10 wks. 3.0 " | 4½ mo. 3.0 " | | |
| 23 | 0.5 w. R. | 7.5 " | 6 wks. 2.0 " | 4 mo. 0.75 " | | |
| 24 | —— | 7.5 " | 8 wks. 3.0 " | 4 mo. 1.75 " | | |
| 25 | 0.75 w. R. | 15.0 " | 6 wks. 3.5 " | 4 mo. 2.0 " | | |
| 26 | 0.75 w. R. | 3.75 " | 6 wks. 2.0 " | | | |
| 27 | —— | 8.5 " | 7 wks. 1.0 " | 4 mo. 0.5 w. R. | | |
| 28 | —— | 5.0 " | 8 wks. 2.0 " | | | |
| 29 | —— | 5.5 " | 6 wks. 2.5 " | 5 mo. 2.25 ag. R. | | |
| 30 | —— | 1.75 " | 10 wks. 1.75 w. R. | | | |
| 31 | 0.5 ag. R. | 6.5 " | 6 wks. 2.0 ag. R. | | | |
| 32* | —— | 9.0 " | 9 wks. 2.25 " | | | |
| 33 | 1.0 w. R. | 7.0 " | 8 wks. 1.25 " | | | |
| 34 | 4.5 w. R. | 8.0 " | 5 wks. 6.0 " | | | |
| 35 | —— | 10.0 " | 6 wks. 2.25 " | | | |
| 36 | —— | 11.0 " | 9 wks. 2.5 " | | | |
| 37 | —— | 1.75 " | 10 wks. 1.75 w. R. | | | |
| 38* | Em. | 13.0 " | 6 wks. 7.0 ag. R. | | | |
| 39* | —— | 6.0 " | 8 wks. 2.5 " | | | |
| 40 | 0.75 ag. R. | 2.5 " | 8 wks. 1.25 " | | | |
| 41 | Em. | 5.0 " | 6 wks. 2.0 " | | | |
| 2 to 59 | | 118.5 " | | | | Represents 17 cases which were only examined once. |
| | | 299.75 | | | | Average 6.40 D. |

Total number of cases 59. Total astig. = 455.25 D. Average of astig. = 7.7 D.

an irregular course *i. e.* where the iris had prolapsed and had subsequently been abscised or where it had become incarcerated in or adherent to the wound. An adhesion of the iris to the wound in its entire length produces the greatest change in the curvature of the cornea. Our case of 22.0 D was one of this sort (case No. 9). Even if these cases in which there were visible complications in the healing of the wound were included, our average would still be higher than that of previous writers. Reuss and Woinow, whose examinations were made upon eyes operated upon partly with flap and partly with linear section, found that the flap extraction was always followed by more astigmatism than the linear extraction. The average of neither was as high as ours. Weiss's examinations, after the curvilinear extraction of Weber, showed still a lower grade of astigmatism. Though the method of making the section undoubtedly has an influence upon the changes of the corneal curvature, I am inclined to believe that the size of the section is a more important factor. A large flap necessarily gapes more than a small one, and consequently causes more flattening. Dr. Knapp, as a rule, makes a large section in his extractions, which allows an easy delivery of the lens with little or no bruising. Most likely it is this which is accountable for the high average of astigmatism found in our cases.

Comparing the results after two weeks with those of four to six weeks later, we find a marked diminution in the astigmatism. A still greater change has, no doubt, taken place in the first days following the operation, during which the eyes could not be examined. As I was able to follow but a few of the cases in which the healing was complicated, we may disregard these entirely. A much higher degree of astigmatism will remain in them than in the cases of uncomplicated healing.

The adhesion of the iris to the wound not only causes the highest grades of astigmatism, but it is also the chief factor in retarding the return of the cornea to its normal shape. The cases of simple healing, though there were several with high degrees of astigmatism, have with but a single exception (case No. 38), become reduced to 3.5 D or less, within

six to ten weeks. The greatest change has, as we would suppose, taken place in the corneæ with the largest deformities. Some of the lower degrees have, by the cicatricial contraction, been changed so that the vertical meridian made flatter by the operation has become the most curved, giving astig. with the rule (Nos. 30 and 37).

The changes after the second month are slight; we see, however, that such occur in the first five to six months.

In the four cases which I saw later than the sixth month, there had been no further changes. It would not be permissible to draw conclusions from such a small number of cases, or to assume that the cicatrization of the cornea is always complete in six months. Laqueur, who followed up a number of cases, put it down as a rule that the form of the cornea does not change after the fourth month, though he admits that it sometimes happens.

The vision, at the first examination, two weeks after the extraction, is never as acute as it is later on. Almost without an exception we can, by the use of cylinder glasses, improve it to some extent, but it is exceptional to attain an acuteness of more than $\frac{20}{40}$. It has been my experience that the patient usually does not accept more than 3.0 D cyl. and I have found none in which a cylinder higher than 6.0 D improved the sight. Among the several factors which account for poorer vision soon after the operation the distortion of the images produced by the abnormal curvature of the cornea is perhaps the most important, though the photophobia, lack of experience in the use of the aphakial eye, and lack of confidence on the part of the patient also play an important role. The humors of the eye are evidently also less clear at this time than later.

In the following weeks there is a decided improvement in the vision, and after four to six weeks we find it, in the uncomplicated cases, ranging from $\frac{20}{40}$ to $\frac{20}{30}$. The eyes which had low grades of astigmatism no longer accept cylinder glasses, while it is exceptional for the ones with higher grades to get improvement of vision with more than 2.0 D.

After four to six months we again find a change in the

cornea, comparatively much less, however, than after the first six weeks. Owing to the greater acuteness of vision, the patient now usually derives benefit from cylindrical glasses which fully correct the corneal error. In the two cases in which the astigmatism was with the rule (1.75 D) at this time, cylinder glasses with their axes vertical did not improve the vision.

In the four cases which I could examine later than six months there was no further change in the vision.

Briefly **recapitulating** we see (1) that two weeks after the flap extraction of cataract, there is corneal astigmatism varying from 1.75 D with rule to 22.0 D ag. r. (2) That the greatest amount of this astigmatism disappears in the following four to six weeks. (3) That it is slowly reduced for six months, after which it seems there are no further changes.

Bearing these facts in mind it is evident that an accurate estimation of the ultimate glasses can not be made at the end of two weeks. It is, I think, the rule among ophthalmologists to give a temporary glass for three to four months, and allow cicatricial contraction to take place before deciding on the final glass. But even in selecting this temporary glass, being governed by our table, we may select it so as to do for permanent use. In cases with less than 5.0 D of astigmatism, which in four months is generally reduced to 1 or 2.0 D we have usually prescribed the spherical lens which gave the best vision even though the addition of a cylinder lens was of benefit at the time. In cases with more than 5.0 D and especially in those in which the wound had healed with complications, we added 2.0 D cyl., with axis indicated by the ophthalmometer and the test glasses, provided the vision was improved. By putting together a large enough number of cases, at least with those in uncomplicated healing, we may be able to arrive at a conclusion as to the changes to be expected in each individual case. The subject would, I think, furnish a field for further investigation.

# UPON THE RELATION BETWEEN THE INTERNAL AND EXTERNAL RECTI AS AFFECTED BY INCREASING DIVERGENCE OF THE ORBITS.

By Dr. L. WEISS.

Condensed Translation by Dr. A. Duane.

(*With Plates V., VI., VII. of Vol. XXIX., Germ. Ed.*)

THE effectiveness of a muscle depends in general upon (1) its size, (2) its quality, and (3) its insertion. In the case of the extrinsic ocular muscles, other factors besides these three have to be considered, the main one being the direction of the muscular cone. This in turn is dependent upon the degree of divergence of the orbits, the depth of the orbit, and the shape of the eyeball. All these factors determine the size of the **contact-arc** [Abrollungsstrecke—unrolling arc] of the ocular muscles, *i. e.*, of that segment of the circumference of the eyeball that is in actual contact with the muscle or with its tendon. The significance which the size of this contact-arc has in determining the amount of movement imparted to the eye is well known.

Now it may happen that in two given cases the size, quality, and insertions of the muscles may be alike, and yet, owing to differences in the degree of divergence of the muscular cone, or to differences in the shape of the eye and in the depth of the orbit, the size of the contact-arcs may also be essentially different. It has seemed to me to be a matter of some interest to subject the conditions here touched upon to a thorough examination.

For this purpose I have had constructed a model representing a horizontal section of the orbits and eyeballs, five times the natural size. This consists of a stand upon which

are mounted two horizontal bars parallel with each other, and admitting of being approximated or separated at will. Each of these carries a pair of slides which can be moved independently of each other. Each of the two slides on the front bar has pivoted to it a flat figure which is a precise model of a horizontal section of the eyeball; and each of the two slides on the hinder bar carries an aperture which is supposed to represent the optic foramen and which is provided with a couple of small pulleys. Threads representing the internal and external recti and attached to the eyeball segments at points corresponding to the actual insertion of the tendons of these muscles,[1] pass over the pulleys and are kept tense by weights at their ends. That portion of the threads in contact with the eyeball segment represents the contact-arc of the corresponding muscle.

The distance between the pivots on the front slides represents the distance between the centres of rotation of the two eyes; the distance between the apertures upon the back slides, the distance between the two optic foramina; and the distance from one parallel bar to the other, the depth of the orbit measured from the optic foramen to the centre of the eye. As these distances can be varied at will in the model, all possible variations occurring in actual practice can be reproduced, and the corresponding value of the contact-arc ascertained by direct measurement. To facilitate such measurement, the circumference of the eyeball segment in the model is graduated, so that the length of thread in actual contact with the circumference can be read off directly.

Thus, if we adjust our model so as to represent a pair of orbits in which the interpupillary distance is 52 *mm*, the distance between the optic foramina 30 *mm*, and the orbital depth (from the line connecting the optic foramina to the line connecting the ocular centres) 29 *mm*,—*i. e.*, orbits in which the angle of divergence is 20° 46′,—we find that the contact-arc for the external rectus measures 10.36 *mm*. and that for the internal rectus 6.63 *mm*. In a second case in

[1] The insertion of the internal rectus was taken as 5.5 *mm* and that of the externus at 6.9 *mm* from the margin of the cornea (in accordance with Fuchs's measurements).

which the depth of the orbit and the distance between the optic foramina are the same, but the interpupillary distance is 74 *mm*,—*i. e.*, a case in which the angle of divergence is 37° 10′,—the contact-arc for the internal rectus is only 2.83 *mm*, while that for the external rectus is 12.30 *mm*.

By means of this apparatus the following points were investigated:

(1) In what way do the contact-arcs of the internal and external recti change with increasing degrees of divergence, in shallow and in deep orbits respectively, the eyes being supposed to be emmetropic?

(2) Other things being equal, in what way are the contact-arcs affected by the presence of axial myopia and axial hypermetropia?

(3) In what way are the contact-arcs affected by differences in the insertions of the muscles?

Considering that in the course of life the shape and size of the eyeball change and that there is a simultaneous alteration in the site of insertion of the muscles as well as in the shape, size, and direction of the orbits, these investigations have a practical significance.

Since the degree of divergence of the orbits increases with the growth of the head and face, it is clear that with this change of direction, the relative power of the interni and of the externi alters too, and that the alteration is in favor of the latter. This change in the relative strength of the muscles ought to be borne in mind when we are trying to graduate the effect of a squint-operation in a young subject; and, moreover, it explains many of the cases that have been observed in which a spontaneous cure of a strabismus convergens which existed in childhood has taken place.

It is evident from all the following tables that *as the divergence of the orbits increases, the contact-arc of the external rectus undergoes a considerable increase, and that of the internal rectus a considerable decrease.*

Another point requiring investigation—and in considering the conditions of tension of the external ocular muscles it is a very important point—is the manner in which the *total length of the internal and external recti* is affected by the

increase in the depth of the orbit, and particularly by the increase in the width of the anterior segment of the orbit that occur in the development of the eye. The following example will show what an effect may be produced in this way. Suppose that in a given case the distance between the optic foramina has its mean value of 30 *mm* and the distance between the lines connecting the optic foramina and the centres of rotation of the two eyes is 29 *mm*, and that in the course of development the interpupillary distance increases from 52 to 74 *mm*. The angle of divergence in the first case will be 20° 46′, the total length of the external rectus from origin to insertion 37.6 *mm*, and the total length of the internal rectus 34.2 *mm*; while, in the second case, the angle of divergence will be 37° 10′, the length of the external rectus 44.35 *mm*, and the length of the internal rectus 35.45 *mm*. That is, the length of the external rectus has increased by 6.75 *mm*, or 17.9 per cent. of its original amount, while that of the internal rectus has increased by 1.25 *mm*, or only 3.6 per cent. of its original amount. The increase in length of the external rectus due to the increasing divergence of the orbits is here five times as great as that of the internal rectus.

Here two cases are conceivable. It may be that in spite of the increase in divergence of the orbits, the internus and externus are still in equilibrium when the visual axes are parallel. In this case we must assume that the externus has grown five times as fast as the internus, which is scarcely conceivable. Or, the two muscles, as is most likely, have grown to about an equal extent, in which case the excess of length of the externus, when the visual axes are parallel, must be ascribed to the fact that this muscle is undergoing a passive extension, and the internus an active contraction, when the eyes are directed straight forward. If this is so, the position of rest (true equilibrium) for these eyes would be, not that of parallelism, but that of divergence of the visual axes. It is probably in just this way that the natural increase in the width of the head taking place in the course of development leads to the spontaneous cure of strabismus convergens in childhood.

The following tables[1] show the results of the measurements made with the apparatus when adjusted to represent all possible variations in the depth of the orbit, the interpupillary distance, and the distance between the optic foramina.

## TABLES I. TO VI.

DD = LINE CONNECTING THE CENTRES OF ROTATION OF THE TWO EYES; ITS LENGTH = INTERPUPILLARY DISTANCE WHEN THE VISUAL LINES ARE PARALLEL; FF = LINE CONNECTING WITH OPTIC FORAMINA.

### I.

DISTANCE BETWEEN DD AND FF = 23 *mm* (SHALLOW ORBITS).

| FF | DD = 50 *mm*. | | | DD = 76 *mm*. | | | Total increase in length of contact-arc of externus. | Increase for every 2 *mm* of increase of interpupillary distance. | Total decrease in length of contact-arc of internus. | Decrease for every 2 *mm* of increase of interpupillary distance. |
|---|---|---|---|---|---|---|---|---|---|---|
| | Length of contact-arc. | | Sum. | Length of contact-arc. | | Sum. | | | | |
| | Externus. | Internus. | | Externus. | Internus. | | | | | |
| 24 | 12.3 | 5.1 | 17.4 | 14.5 | 0.8 | 15.3 | 2.2 | 0.17 | 4.3 | 0.33 |
| 30 | 11.2 | 7.5 | 18.6 | 14.3 | 1.6 | 15.9 | 3.1 | 0.24 | 5.9 | 0.45 |
| 34 | 10.8 | 7.9 | 18.7 | 13.4 | 3.2 | 16.6 | 2.6 | 0.20 | 4.7 | 0.35 |

### II.

DISTANCE BETWEEN DD AND FF = 25 *mm*.

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 24 | 11.50 | 5.50 | 17.00 | 14.1 | 1.0 | 15.1 | 2.60 | 0.20 | 4.50 | 0.34 |
| 30 | 10.66 | 6.50 | 17.16 | 14.0 | 1.25 | 15.25 | 3.34 | 0.26 | 5.25 | 0.4 |
| 34 | 9.85 | 8.0 | 17.85 | 13.9 | 2.9 | 16.8 | 4.05 | 0.31 | 5.1 | 0.39 |

### III.

DISTANCE BETWEEN DD AND FF = 27 *mm*.

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 24 | 10.66 | 5.50 | 16.16 | 13.50 | 1.33 | 14.83 | 2.84 | 0.21 | 4.17 | 0.32 |
| 30 | 10.33 | 6.33 | 16.66 | 13.25 | 1.66 | 14.91 | 2.92 | 0.22 | 4.67 | 0.36 |
| 34 | 9.7 | 7.2 | 16.9 | 12.70 | 3.20 | 15.9 | 3.00 | 0.23 | 4.0 | 0.30 |

### IV.

DISTANCE BETWEEN DD AND FF = 30 *mm* (ORBITS OF MEDIUM DEPTH).

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 24 | 10.50 | 5.50 | 16.0 | 13.50 | 0.66 | 14.16 | 3.0 | 0.23 | 4.84 | 0.37 |
| 30 | 10.00 | 6.50 | 16.5 | 12.50 | 2.00 | 14.50 | 2.5 | 0.19 | 4.50 | 0.35 |
| 34 | 8.9 | 7.20 | 16.1 | 12.40 | 3.30 | 15.7 | 3.5 | 0.27 | 3.90 | 0.3 |

[1] In the original, the measurements are given for all interpupillary distances between 50 *mm* and 76 *mm*. Here, the measurements for the extreme limits alone are given, these establishing quite satisfactorily the author's conclusions.

V.

DISTANCE BETWEEN DD AND FF = 33 *mm*.

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 24 | 9.25 | 5.50 | 14.75 | 12.33 | 2.0 | 14.33 | 2.08 | 0.16 | 3.5 | 0.27 |
| 30 | 9.0 | 6.75 | 15.75 | 12.00 | 2.75 | 14.75 | 3.c | 0.23 | 4.0 | 0.3 |
| 34 | 7.9 | 7.1 | 15.00 | 11.2 | 3.7 | 14.9 | 3.3 | 0.25 | 3.4 | 0.27 |

VI.

DISTANCE BETWEEN DD AND FF = 35 *mm* (DEEP ORBITS).

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 24 | 9.0 | 5.8 | 14.8 | 12.3 | 1.9 | 14.2 | 3.3 | 0.25 | 3.9 | 0.3 |
| 30 | 8.6 | 6.7 | 15.3 | 11.4 | 2.8 | 14.2 | 2.8 | 0.21 | 3.9 | 0.3 |
| 34 | 7.3 | 8.0 | 15.3 | 11.0 | 3.8 | 14.8 | 3.7 | 0.28 | 4.2 | 0.2 |

The conclusions to be drawn from these tables are as follows:

Taking the three factors to be considered, viz., the distance between the optic foramina (interforaminal distance), distance between the line connecting the two optic foramina and that connecting the centres of rotation of the two eyes (depth of the orbit), and the distance between the centres of rotation of the two eyes (interocular distance), we find that in emmetropic eyes:

(1) If the interforaminal distance and the depth of the orbits remain the same, the contact-arc of the external rectus increases and that of the internal rectus diminishes as the interocular distance increases; the rate of decrease in the case of the internus being greater than the rate of increase in the case of the externus.

(2) If the interocular distance and the depth of the orbits remain the same, an increase in the interforaminal distance produces a comparatively rapid increase in the length of the contact-arc of the internus and a (less rapid) decrease in that of the externus.

(3) If the interocular and interforaminal distances remain the same, an increase in the depth of the orbit causes a decrease in the length of the contact-arc of the externus and a (generally less rapid) increase in that of the internus.

(4) Other things being equal, the sum of the contact-arcs increases when the interforaminal distance increases, and diminishes when either the depth of the orbit or the interocular distance is increased.

(5) The relations between the contact-arcs of the internus

and the externus are most unfavorable for the former muscle when the orbits are shallow, the interforaminal distance small, and the interocular distance great (*i. e.*, when the divergence of the orbits is at its maximum). Thus, when the interocular distance is 76 *mm*, the interforaminal distance 24, and the depth of the orbit (measured from the interocular to the interforaminal lines) only 23, the ratio between the two contact-arcs is 14.5 : 0.8 (= 1 : 0.055).

The relations are the most favorable for the internus when the orbit is deep, the interforaminal distance great, and the interocular distance small; in other words when the degree of divergence of the orbits is but slight. Thus when the depth of orbit is 35 *mm*, the interforaminal distance 34, and the interocular distance only 50, the ratio is 7.3 : 8.0 (= 1 : 1.09), *i.e.*, in the second case the relations are nearly twenty times as favorable for the internus as in the first.

The relations above touched upon are those that subsist in emmetropic eyes. In *order to study those that are found in ametropia*, the schematic section of the emmetropic eye used in the model from which these measurements were taken was replaced by two other sections, one representing an eye having an optic axis of 29 *mm* (*i.e.*, with an axial myopia of 15 D), the other an eye with an optic axis of 19 *mm* (*i.e.*, with an axial hypermetropia of 14 D). In making the measurements the interforaminal distance was taken as 30 *mm* (its mean value) and the depth of the orbit (measured from the interforaminal line to the line connecting the centres of rotation of the two eyes) as 27 *mm*. The results may be compared with the corresponding ones for emmetropic eyes as given in section III. of the preceding table. The comparison is still more readily made from the graphic representation given in Plates V., VI., VII., in which the results for the myopic and hypermetropic eyes are contrasted with those obtained from emmetropic eyes having approximately the same degree of orbital divergence.

## TABLE VII.

### LENGTH OF THE CONTACT-ARCS.

| | In highly myopic eyes (axial length 29 *mm*). | In highly hypermetropic eyes (axial length 19 *mm*). | Ratio between the lengths in the myopic and the hypermetropic eyes. |
|---|---|---|---|
| **A.—INTERPUPILLARY DISTANCE = 50 *mm*.** | | | |
| Contact-arc of externus | 17.5 | 4.8 | 1 : 0.27 |
| Contact-arc of internus | 10.4 | 3.4 | 1 : 0.33 |
| Sum | 27.9 | 8.2 | 1 : 0.29 |
| **B.—INTERPUPILLARY DISTANCE = 76 *mm*.** | | | |
| Contact-arc of externus | 20.5 | 7.6 | 1 : 0.37 |
| Contact-arc of internus | 1.7 | 0. | ——— |
| Sum | 22.2 | 7.6 | 1 : 0.34 |
| **C.—CHANGE IN THE LENGTH OF THE CONTACT-ARCS PRODUCED BY INCREASING THE INTERPUPILLARY DISTANCE FROM 50 TO 76 *mm*.** | | | |
| Total increase in contact-arc of externus | 3.0 | 2.8 | |
| Decrease in contact-arc of internus | 8.7 | 3.4 | |
| Diminution in the sum of the contact-arcs | 5.7 | 0.6 | |

If it is desired to investigate the effect which *variations in the site of the insertions of the muscles* will have upon the corresponding contact-arcs, we have only to add to or deduct from the values given in the above tables the amounts by which the insertions are supposed to be displaced forward or back; *i.e.*, if the internal rectus is inserted 2 *mm* farther back than usual, this amount will have to be subtracted from the value of its contact-arc as given in the table.

# EXPERIMENTAL AND ANATOMICAL STUDY OF THE PROCESS OF REPAIR AFTER NEURECTOMY OF THE OPTIC NERVE IN THE RABBIT.

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*(With Plates X. and XI. of Vol. XXIX. of Germ. Ed.)*

ONE of the most conclusive facts to contradict the migration theory of the propagation of sympathetic ophthalmia as advanced by Leber and Deutschmann, is the clinical experience that it will occur even after neurectomy of the optic nerve.

Though the observations on this subject are not numerous, the few that have been made are thorough enough to withstand the severest criticism. Schirmer[1] in his publication *Klinische und pathologisch-anatomische Studien über die Pathogenese der sympathischen Augenentzündung*, in which he collated previous publications, came to the conclusion that two of the cases furnished sufficient evidence that the resection of a piece of the optic nerve was not sufficient to prevent sympathetic inflammation.

One of these cases was observed by Trousseau. The patient had phthisis of the left globe resulting from a perforating injury received four years previously. As the eye suddenly became painful and the other eye showed symptoms of irritation, 4–5 *mm* of the nerve of the left eye were resected. In spite of this, irido-cyclitis developed thirteen

[1] Schirmer, *Graefe's Archiv f. Augenheilk.*, xxix.

weeks later in the right eye, necessitating enucleation of the primary one.

The other case from the practice of Schmidt-Rimpler was also a perforating injury of the left eye. After remaining quiescent for six months, the eye became painful, when neurectomy of optic and ciliary nerves was made, 15 *mm* of the optic nerve being removed. In this case the left eye had to be removed one and a half years later, to relieve marked sympathetic irritation which had arisen in the right eye. There were no bacteria found in either the resected piece of nerve or the globe. With Weigert's stain normal ciliary nerves were demonstrated.

Schirmer does not positively exclude the migration theory, of which, however, he is an antagonist, on this clinical evidence, for, as he says, accurate examinations of the anatomical condition of the central and distal nerve ends in the first weeks and months after the operation are wanting.

He admits that his own experiments on animals in this direction, in which he hoped to ascertain whether microorganisms passed from the globe to the distal end of the nerve after resection, are incomplete and unsatisfactory.

Deutschmann,[1] who in his extensive experiments on "Ophthalmia migratoria" has endeavored to solve this problem, did not know how to account for the occurrence of sympathetic ophthalmia in these two cases.

He made a number of experiments on animals for which he selected rabbits, supposing that their optic tract differed little from that of man.

Neurectomy was performed by undermining the conjunctiva over the superior rectus muscle, severing the muscle from the sclera and making the way to the optic nerve with a squint hook. The eye was then luxated downwards and the optic nerve divided as close as possible to the optic foramen. The eye was then turned with nerve outward, which was cut close to the sclera. The eye was replaced and the conjunctival wound sutured. In some cases the operation could not be completed on account of excessive hemorrhage in the orbit.

[1] Deutschmann, *Beiträge zur Augenheilkunde*, x., 1893.

Deutschmann operated on 6 rabbits in this way, removing from 2–5 *mm* of the nerve. Phthisis bulbi or degenerative changes in the cornea sometimes followed. Suppuration of the orbital tissue was never observed.

He killed the animals at different periods: one 4 days, one 7 days, one 3 weeks, one 1 month, one 2 months, one 8 months after the operation.

Just before or immediately after death he made an opening into the skull over the cerebrum and injected a quantity of Chinese ink suspended in water into the arachnoid space.

At the autopsy, besides some changes which were foreign to the subject, it was seen that in all the cases, excepting the one killed on the 4th day, the cut ends of the optic nerve were connected by a well defined band of tissue, and that the ends had approached each other to quite a degree.

The microscopical examination showed: (1) that the connecting band, even after 8 months, was very delicate. It contained a large number of nuclei and carried blood-vessels. Although it was not as sharply defined as the macroscopical appearance would suggest, these properties easily differentiated it from the other tissue of the orbit. At intervals it seemed to have an endothelial lining; (2) that the cut ends of the optic nerve were not united by scar tissue, so that the injected solution of the arachnoid space could circulate freely between them; (3) that the stain, after reaching the central end of the optic nerve, did not spread over the orbital tissue, but passed along the connecting band to the distal end and into the papilla. This would, of course, not exclude isolated particles which found their way into the cellular tissue of the orbit by chance.

Based upon these histological investigations, Deutschmann came to the conclusion that "the connecting band kept open the communication between the arachnoid space of the distal and central nerve ends, and that the lymph current from the brain to the eye passed through this band, though it may have been circulated slower than normal." He considered this as sufficient evidence that bacteria could pass along the central end of the nerve.

As my experiments on animals with injections of staining

solutions **contradict all of the principal features described by Deutschmann,** I will report them in full.

In carrying out my experiments I proceeded in the same manner as described by Deutschmann, killing the animals in about the same intervals. The wounds all healed readily, and in but a single case was the operation followed by phthisis of the globe or vascularization of the cornea. Owing to the shrunken condition of the globe and consequent altered topographical relation in the orbit in this case, it in no way compared with the orbit of man, and I had finally to exclude it from my cases. I used, besides the Chinese ink, a solution of Berlin blue which could pass through the lymph channels in case the suspended particles in the ink should not do so.

**Rabbit No. I.,** seven months old. *Neurectomy was done on June* 3, '93, *on left eye*, 3 *mm* of the nerve being removed. The conjunctiva was sutured. Immediately after the operation the pupil was contracted. No changes were discernible with the ophthalmoscope. On June 15th the only trace left of the operation was the conjunctival scar. The retinal vessels were slightly narrower than those of the right eye. Three months later the nerve fibres and the disc appeared glazed and white and the vessels were extremely narrow. Above the disc there was marked retinitis pigmentosa. An area of about 4 times the size of the disc was covered with brownish-black deposits. This pigment in the retina was deposited in a wedge shape, the apex of which pointed towards the disc. The cornea was clear. The pupil was dilated and did not react to light. The shape of the globe was unaltered.

The rabbit was killed with ether. The skull was opened near the middle of the left cerebral lobe and about 2½ drachms of Berlin blue solution were injected into the subdural space.

As it is not known with any degree of certainty with how much pressure the lymph flows from the brain into the eye, we simply inject our solution with a gentle and steady pressure.

The arachnoid space of the cord, laid bare at its lower termination in order to be able to watch the distribution of

the solution, was tensely filled, as one would suspect, from the large quantity of fluid injected.

The animal was beheaded and the head hardened for 8 days in absolute alcohol (the alcohol frequently renewed). The stain was found abundantly in all of the lymph spaces of the brain, where it had become fixed, so that we were able to get the orbital tissue, nerve and chiasma, in one piece without the loss of any of the staining solution.

The optic nerves near the chiasm appeared about the same to the naked eye. They were of the same size and both took on a delicate blue tint. The specimen was cut in two at the commissure and both halves imbedded in celloidin.

Microscopical examination of a series of sections of the *right eye*, 4 weeks later, revealed a delicate blue stripe surrounding the nerve, which extended as far as the papilla. The neighboring fat had taken on none of the stain.

The central end of the *left nerve* was more than 3 *mm* distant from the papilla. The stain had penetrated to the conical end of the nerve stump, while there was no stain visible in the orbital tissue with the naked eye. Contrary to the condition present on the right side, we could see narrow grayish bands running through the white stained fat. They originated near the end of the optic nerve and bifurcated in various directions.

The subvaginal space of the *right* nerve was densely injected, though it was not possible to distinguish microscopically between the subdural and the subarachnoid space. On the other hand, the intervaginal lymph space was stained in spots, while in places the line of incision through the dense sheath was recognizable.

Tenon's space contained no stain. The supra-choroidal space, however, was filled almost to the equator of the globe. The fluid had penetrated at the papilla between the sclera and choroid. At the point of entrance of the nerve into the sclera the parts were so covered by the stain that histological minutiæ could not be made out. The perivascular spaces around the venæ vorticosæ had received none of the fluid.

The subvaginal space of the *left* nerve was also tensely filled with staining fluid, as well as parts of the subvaginal space. Not a particle of the Berlin blue could be detected in the orbit outside of that in the lymph vessels of the nerve, though the highest power (Zeiss apochromatic 2500 x) was used. *The stain was present in large quantity in the central stump. It had not been able to penetrate the scar, though it had caused the dense sheath to bulge somewhat.*

All of the sections which involved this part presented about the same picture. The nerve sheath gradually merged into fibrous scar tissue. The contraction of this tissue had drawn the sheath together, which accounted for the conical shape of the stump. The scar tissue contained more nuclei than the nerve sheath and sclera, though the nuclei were not more abundant than in any other scar tissue or in the adipose connective tissue. The band divided near the nerve stump (Fig. 1, *c*) into several filaments. The middle one, which was the thickest, tapered down rapidly and was lost in the orbital fat, when about one third the distance to the sclerotic (Fig. 1, *d*). Another band a little longer than the other found an insertion in the adventitia of a large vessel (Fig. 1, *e*).

Fig. 2 represents the distal stump of the nerve. It was separated from the surrounding fat by a ring of dense connective tissue containing few nuclei. The bands seemed to coalesce on both sides with the sclera (Fig. 2, *a*). Scattered throughout the stump, pigment cells and granulation tissue were seen, as represented in Fig. 1, *b*. The retina had undergone fibrous degeneration, and presented, at the site where the ophthalmometer had previously revealed such a deposit, a large number of pigment cells.

**Rabbit No. II.**, eight months old. June 4, 1893. *Neurectomy of the left optic nerve* was made in the manner described above. Four *mm* of the nerve were removed. It was not cut close to the sclera. There was slight hemorrhage. Conjunctival suture was applied. Ophthalmoscope showed no changes in the interior.

On June 28th, the disc appeared pale and the retinal vessels narrow. No trace of an operation was visible. The cornea was clear, normally sensitive; the pupil large.

On September 10th, the disc and medullated nerve fibres were glossy white. There was a deep excavation and the vessels were extremely narrow.

After killing the animal, 3⅝ drachms of a saturated solution of Berlin blue were injected into the subdural space as in the previous case. The rabbit was then beheaded and the head hardened in alcohol.

September 21st the stain was seen deposited throughout the arachnoid. The nerve had a blue tint.

The specimen was imbedded and on December 10th the sections were made.

On the *right* side the sheath was, as in the other case, densely filled with the injected fluid. The subvaginal space was also filled to a great extent, while in the suprachoroidal space it could be traced almost to the ciliary body.

On the *left* side the cut surface of the nerve had a grayish-red appearance as far as the chiasm, where it became as white as the right nerve. The distance between the two cut surfaces of the nerve measured just 4 *mm*. The nerve sheath of both ends was closed by dense scar tissue. The staining fluid had penetrated only as far as the central end of the nerve. The scar tissue, which was very similar to that in the first case, passed along as a single band for a short distance, when it terminated abruptly by sending branches in every direction between the fat cells. It was made up of coarse fibres which contained few more nuclei than the nerve sheath. In the arachnoid there were accumulations of spindle cells here and there (Fig. 2, *b*). The distal nerve stump was covered over by scar tissue which closed the nerve sheath. Some of the sections showed a communication between this tissue and the scar tissue emanating from the middle of the nerve. The scar tissue contained no blood-vessels.

**Rabbit No. III.**, six months old. *Neurectomy was performed on the left eye*, removing 5 *mm* of the nerve, July 19, 1893. The profuse hemorrhage was finally arrested by compression. About 1 *mm* of the nerve was left on the globe. The ophthalmoscope showed no changes.

July 25th.—The location of the operation was no more discernible.

November 11th.—The retinal vessels were narrow, the papilla and medullated nerve fibres pale. The animal was killed and 5 drams of the Berlin blue solution injected into the subdural space of the brain. The subdural space of the cord was densely filled. Some of the veins in the abdomen were also injected, indicating that the nozzle of the syringe must have been in the pia-mater part of the tissue. The specimen was prepared as the others.

In making sections of the *left* eye the central end of the nerve unfortunately was lost. The orbit contained no staining fluid. The piece of nerve left on the globe was also free from stain, although it had not been completely closed by scar tissue. A single cord of fibrous tissue passing through the fatty tissue was not found. There were, however, a number of filaments which bifurcated, sending part of the fibres to the nerve stump to which they were attached, near the point where it penetrates the sclerotic. The tissue contained few nuclei.

On the *right* side, the sub- and supra-vaginal spaces were well injected. The suprachoroidal space was filled as far as the ciliary muscle. Part of Tenon's space also contained some of the fluid as well as the sheaths of some of the venæ vorticosæ which, no doubt, it reached from within.

**Rabbit No. IV.,** seven months old. On September 22, 1893, *2 mm of the left optic nerve were resected* close to the sclerotic. Not more than 10 drops of blood were lost during the procedure. The ophthalmoscope showed the retinal arteries to be about empty, while the veins were narrower than usual.

September 23d.—The arteries contained blood, but were very narrow. The veins were tortuous.

October 2d.—Deposit of pigment in the upper part of the retina. The disc was pale, the vessels not quite as narrow as before.

October 6th.—Increase of pigment. The retinal vessels appeared as mere shreds, while the papilla and nerve fibres appeared chalky-white.

October 13th.—The animal was allowed to bleed to death. The vertex of the skull was removed, and the brain cut away

as far as the chiasm. The roof of the orbit was removed, and the rectus superior, in which union had taken place, laid bare. The optic nerve was visible almost to the optic foramen. It was in contact with the sclera, but had been displaced downwards from the point of entrance in the sclera about 2 *mm.* Macroscopically it appeared as if the nerve was held to the sclera by delicate fibres, which were surrounded by fat. The nerve was no smaller than the right one.

The specimen was hardened in Müller's fluid and imbedded on January 2, 1894. Part of the sections were stained according to Weigert's method and some with hæmatoxylin-eosin.

The cut end of the *left* nerve had become completely closed with connective tissue. The scar tissue still contained a large number of nuclei, but had by its contraction drawn the nerve sheath very much together. It was largely made up of spindle cells and was loosely attached to the surrounding fatty tissue. The disc was deeply excavated, and the retina had partly undergone a fibrous degeneration and was dotted with lumps of pigment. The central cut end of the nerve came to within 3 *mm* of the eye. It had the usual conical appearance and was attached to the tunica adventitia of some of the larger blood-vessels near the sclera by a delicate fibrous tissue which contained many nuclei. The extremity of the nerve was invaded with blood-vessels and contained a large number of nuclei. (Fig. 1, *b.*) The nuclei in the subvaginal space had also multiplied for a short distance towards the brain. There was as far as could be seen no connection between the two stumps. The medullated nerve fibres had ceased to take the Weigert stain, although there were no other anatomical conditions to indicate a high degree of degeneration.

**Rabbit No. V.,** five months old. *Neurectomy of the left optic nerve,* September 15, 1893. 2 *mm* of the nerve were removed. Cutting of the nerve near its entrance into the sclerotic caused some laceration, so that afterwards blood could be seen on the disc with the ophthalmoscope. The arteries were very narrow. The conjunctival wound was stitched.

September 28th.—The blood had been partly absorbed and the papilla appeared paler than the right one.

The animal was killed and the skull and orbit opened as in the previous case. Upon removing the superior rectus muscle the optic nerve was seen in the depth, as well as remnants of blood. An attempt was made, by careful dissection, to find a connecting band between the two nerve ends, as described by Deutschmann, but in vain. The space between the cut surface of the central end of the nerve and the sclerotic, which measured 2–3 *mm*, was filled with fat and a few fibres of connective tissue. The whole had a brownish-red appearance.

This case was not examined microscopically.

**Rabbit No. VI.,** ten months old, which had a coloboma of the iris and traumatic cataract of the left eye, the result of previous experiments. *Neurectomy was performed on the right eye*, October 19, 1893, 3 *mm* of the nerve being removed close to the sclera. The conjunctiva was sutured. There were no ophthalmoscopic changes.

October 25th.—Wound had healed, the retinal vessels were wide, the disc normal.

November 3d.—The disc was slightly blanched, otherwise no signs of the operation were visible.

November 4th.—The animal was killed, and 2½ drachms of suspended Chinese ink injected into the subdural space of the brain. The subdural space of the cord was well filled. The animal was beheaded and the head hardened in alcohol, and subsequently imbedded.

The sub- and supra-vaginal spaces of the *left nerve* were exceptionally well injected, the supra-vaginal space had taken the stain in its entire extent. The fluid had also penetrated into Tenon's space and some of the lymph sheaths around the venæ vorticosæ. The presence of the fluid could be detected in the suprachoroidal space, although it could not be definitely outlined, owing to the presence of the choroidal pigment. Particles of the stain were also detected in the orbital fat near the sclera, which had evidently escaped from the supra-vaginal and Tenon's spaces.

On the *right side* a scar had formed over the central nerve

stump. The scar tissue did not differ materially from that described in the previous cases. It contained few nuclei. The sheath had been drawn together at its end, giving the stump its usual conical appearance. The extremity of the nerve contained some granulation tissue, which had firmly united with the scar tissue. The latter did not form a single band, but scattered in every direction, to be lost in the fatty and lacerated muscular tissue. The ink had passed along the sheath as far as the scar. It had in fact penetrated and passed ½–1 *mm* beyond it. It had escaped, as Fig. 3, *a*, demonstrates, through a small opening on one side of the sheath, indicating that the nerve had not been fully closed in by the new tissue. In four-fifths of all the sections made of this region, this small opening was not seen. The stained area, before it reached this opening, was broad; here it became narrow to broaden again beyond the fistula. It finally diffused in the orbital fat.

The stump of nerve left attached to the sclera was fully closed in by a broad band of scar tissue. It did not contain a particle of the stain. A connecting band between the nerve ends was not to be found.

**Rabbit No. VII.,** full-grown rabbit. *Neurectomy of left nerve* was made December 1, 1893. Removal of 3 *mm* of the nerve. No changes were visible with the ophthalmoscope. The conjunctiva was sutured and the wound healed kindly.

January 5, 1894.—The disc and medullated nerve fibres were pale, the vessels narrow; 1¼ drachms of suspended ink were injected into the subdural space of the brain. The space around the cord was well filled. The head was hardened in alcohol.

January 15th.—The ink had been deposited in all of the lymphatic spaces of the brain. The orbits were imbedded in celloidin.

The lymph space of the *right nerve*, Tenon's and the suprachoroidal space was filled with ink. The orbit was free of it.

The *left* papilla and the central cut end of the nerve covered with scar tissue. The ink had passed to the

extremity of the nerve, but no farther. The scar tissue which sent filaments all through the orbit, contained a few nuclei. Some of the filaments were attached to the tissue covering the papilla.

**Rabbit No. VIII.**, full grown. *Neurectomy of left nerve*, December 1, 1893. Removal of 5 *mm* of the nerve. Slight hemorrhage. Conjunctival suture. The ophthalmoscope showed the retinal vessels to be slightly narrower than normal.

December 3d.—Diffuse opacity of the cornea, making an ophthalmoscopic examination impossible. T normal. No iritis.

December 4th.—The animal was killed, and 2½ drams of suspended ink were injected into the subdural space of the brain. The canal of the cord was densely filled. The head was hardened in alcohol, and after fixation of the injected stain was imbedded and cut.

On the *right* side the trabecular network of the subvaginal space was particularly well brought out by having been put on the stretch by injection. The fluid only got as far as the point of penetration of the nerve in the sclera. None was found in Tenon's or the supravaginal spaces or the orbital tissue.

On the *left* side a large extravasation of blood into the orbital fat had taken place, which accounted, no doubt, for the distance between the nerve ends being greater than usual (10 *mm*). The central nerve end projected slightly beyond the sheath (Fig. 4, *b*). The end of the nerve was infiltrated with small cells (Fig. 4, *c*). No scar tissue was to be seen. The subvaginal space of the piece of nerve attached to the eye naturally contained no staining fluid.

A peculiar feature of this case was the presence of a slight detachment of the choroid, due to hemorrhage beneath it, the result of the operation.

**Rabbit No. IX.**, seven months old. *Neurectomy of the left nerve*, October 19, 1893. Removal of 2 *mm* of the nerve close to the sclera. Slight hemorrhage. Conjunctival suture. Ophthalmoscope showed slight narrowing of the vessels, but no further changes.

October 25th.—Proliferation of pigment in the upper and posterior part of the retina. The vessels appeared large.

November 3d.—Moderate blanching of the disc and the nerve fibres. Narrowing of the vessels. Slight increase in pigment.

The abdominal aorta was opened, and, after death, was ligated. Twenty-four hours later, after the temperature of the animal had been brought up to blood temperature on the water bath, a mass of Berlin blue and gelatine was injected into the ascending aorta. The orbits were hardened in Müeller's fluid, subsequently washed in water, and imbedded. The sections were stained with Orth's picro-lithion carmine.

The arteries and capillaries of the *right* side and many of the veins were well injected. Both cut surfaces of the *left* nerve were covered by scar tissue which was almost identical with that described in the other cases. All the vessels of the orbit had been made prominent by the injected mass. In the scar tissue only a few isolated capillaries were seen. There were less than in the surrounding fat. The choroidal and retinal vessels were all filled with the blue mass. They appeared much smaller and less numerous at that part of the retina where degenerative changes had taken place. The retinal changes consisted in total atrophy of the mollecular layers and the nervous element. They had been replaced by coarse connective-tisssue bands with large interstices. Pigment granules were scattered throughout the tissue. The specimens corresponded entirely to the conditions found by Wagenmann.

**Conclusions:** In those cases where the rabbit was allowed to live 5, 7, 14, and 22 weeks after the neurectomy, none of the injected fluid had escaped from the central nerve stump. On the other hand, in those which had lived from 3 to 14 days only, some of the pigment was found in the orbit. From this it would follow that a certain time must elapse after neurectomy before the cut ends are closed tight enough to prevent the fluid from passing out of the nerve sheath. The time varies from 2 to 5 weeks. Fluid injected into the subdural space after that time, even though the pressure be

greater than that of the cerebro-spinal fluid under normal conditions, is checked at the end of the nerve by the newly formed scar tissue. A partial closure exists earlier, as the case demonstrated in which the rabbit was killed early and where the fluid escaped from the cut end of the sheath by a very small opening.

Anatomically the scar tissue was the same in all the cases. It was made up of ordinary fibrous connective tissue with few nuclei. It had about the same appearance after seven weeks as it did after six months, which was to be expected in a wound which had run an aseptic course.

The tissue had the property of uniting with the nerve sheath and of drawing the same together over the end of the nerve, giving it a conical appearance.

Furthermore, it did not consist of a single cord or band, but was bifurcated and distributed in every direction, becoming attached wherever the parts had become abraded or torn by the operation.

It contained few blood-vessels, as could be seen, not only in the various sections but by the injection of the blood vessels in one case. (Rabbit No. IX.)

The distance between the two cut surfaces of the nerve always corresponded to the size of the piece removed. It was, in fact, even larger than the section removed in several of the cases. Not in a single instance could a tendency of the scar tissue to connect the two nerve ends be made out.

There was no endothelial lining to the bands of connective tissue, nor were there newly formed lymph spaces between the tissue. The staining fluid, where it had been injected early to pass through the end of the sheath, diffused through the orbital fat, and, though a large quantity had been used, none of it reached the region of the papilla.

The granulation tissue which was frequently found on the ends of the nerve stumps deserves special mention. For months it appeared younger than the neighboring scar tissue. This could perhaps be explained by the fact that the two had an entirely different origin. The capillaries and granulation tissue at the end of a degenerating nerve were derived from the vessels of the pial sheath and the interior

of the nerve, while the scar tissue grew from the orbital tissue.

The fact that the suprachoroidal spaces were filled in most of the cases in the uninjured eye also deserves special mention, as Schwalbe and other investigators after him never succeeded in injecting this space from the brain. It must be admitted that the fluid used in my cases for injecting did not always meet the physiological requirements, nevertheless it is evident from the experiments that the supravaginal and suprachoroidal spaces are not so distinctly separate as Schwalbe asserts.

What relation the above experiments bear to the migration theory is evident. If the formation of scar tissue in man is the same as it is in the rabbit, micro-organisms can certainly not pass from the globe to the nerve sheath of the central stump after thirteen weeks, much less after one and a half years.

*Explanation of the Plates.*

FIG. 1.—Winkel, ocular 8, objective 1.

*a* Fibrous scar tissue.
*b.* Granulation tissue in the nerve.
*c.* A lateral band of connective tissue.
*d.* Continuation of the band *a*.
*e.* Artery.
*f.* Capillary from the pial sheath of the nerves.
*g.* Normal nerve.

FIG. 2.—Winkel, ocular 4, objective 4. Scar of distal end of nerve of Rabbit No. I.

*a.* Cord which unites with sclera.
*b.* Cells which originated in pia and arachnoid.
*c.* Sclera.

FIG. 3.—Winkel, ocular 3, objective 4. Scar of central end of nerve of Rabbit No. VI. The Chinese ink has been colored blue.

*a.* Point of escape of the solution.
*b.* Distribution of solution in tissue.

FIG. 4.—Winkel, ocular 3, objective 1. Scar of central end of Rabbit No. VIII. The Chinese ink colored blue.

*a*. End of nerve extending beyond the nerve sheath.

*b*. Mass of injected material which has passed beyond the sheath.

*c*. Infiltration with small cells.

*d*. Coagulated blood in orbit.

# THREE CASES OF PECULIAR PIGMENTED STRIATIONS IN THE FUNDUS.[1]

By Dr. B. WALSER, Vienna.

Translated by Dr. Ward A. Holden.

(*With Plates XVI. and XVII. of Vol. XXXI. Germ. Ed.*)

THROUGH the kindness of Professor Fuchs I am able to record two cases of striations in the fundus, only one similar case (Plange) having been reported.[2]

Case 1.—A woman of twenty-three came to the clinic on account of an inflammation in the right eye. There were precipitations on the lower portion of the cornea and on the lens, and a broad posterior synechia. About the disc was a network of gray stripes radiating outward from a circular stripe (see Fig. 1). Many of these stripes were bordered on each side by lighter white-grayish stripes. The stripes were sharply but irregularly

[1] From Prof. Fuchs' clinic in Vienna.

[2] At the time this was published, *Arch. f. Aug.*, p. 345, 1895, similar cases beside Plange's had been described by Knapp,[3] Stephenson,[4] and Holden,[5] while another has just been reported by Dr. Schweinitz at the meeting of the Am. Ophthal. Soc. (see report of the meeting near the end of this number). In all but one of these cases retinal hemorrhages were present, and in three cases the development of the striations from hemorrhages could be followed.—Translator.

[3] H. Knapp: On the Formation of Dark Angioid Streaks as an Unusual Metamorphosis of Retinal Hemorrhage (Apr. No., 1892, of these Archives, vol. xxi., p. 289. This paper with a drawing, by an omission of the author, has not yet appeared in the German Edition.)

[4] S. Stephenson: Angioid Streaks in Retinæ. There were hemorrhages in the retina. *Trans. of Ophthal. Soc. United Kingdom*, vol. xii., p. 140, 1892, with a fine colored drawing.

[5] W. A. Holden: On the Probable Hemorrhagic Origin of the Striated Affections of the Retina. These Archives, vol. xxiv., p. 247, Apr. No., 1895. Transl. in *Arch. f. Aug.*, Bd. xxxi., p. 287, 1895. With two drawings.

outlined, and some ran beneath the vessels. The fundus of the left eye was similar. The acuteness of vision was normal in each eye. The visual field and the color- and light-senses were normal. The patient was of delicate physique and poorly nourished. No tuberculosis or syphilis.

Two years previously the left eye had been inflamed, and had been treated with atropine and yellow salve, also mercurial inunctions had been made. The sight, which had been affected, was completely restored. Later the left eye became inflamed again. The present attack had come on spontaneously two weeks before. Vision was clouded and there was some pain.

Case 2.—A man of twenty-two. Exterior and media normal. In the periphery there was a peculiar coarse mottling of the fundus, with pale yellowish-red spots, which near the disc were larger and became confluent (Fig. 3). This mottling stopped about 5 P. D. from the disc. The disc (Fig. 2) was of normal color, but not sharply outlined. About it was a narrow pale zone, and limiting this zone was a circular line of gray pigment, from which radiated five irregular and branched stripes of gray. Some of these were bordered with white lines, and along some of them the fundus was discolored in a broader stripe. The condition in the left eye was similar. Acuteness of vision, visual field, color fields, and light-sense were normal. The patient was apparently healthy and had never been seriously ill. At the age of three the left eye was inflamed for five months, and there was blepharospasm. For the past two years he had complained somewhat of the eyes in the winter time.

In both cases nothing could be learned as to the time when the disease began, nor as to its cause. In both cases the two eyes were affected, and vision was normal.

What anatomical changes underlie these ophthalmoscopic conditions; what pathological processes have brought them about; at what age the processes have occurred—all these questions can only be answered with a certain probability.

In experimenting with the Purkinje figures the patients could be made to perceive the image of the pigmented stripes as well as that of the retinal vessels. Movement of the strong convex lens, by means of which light was thrown upon the sclera in these experiments, did not produce a movement of the images that was perceptible to the patient,

and therefore the experiment threw no light upon the position of the stripes in the retina.

The following affections may, in my opinion, be excluded *a priori*, viz., retinitis pigmentosa, retinitis striata, and striæ in the retina after detachment.

Retinitis pigmentosa could be excluded on account of the absence of the typical arrangement of pigment, atrophy of the optic nerve and retina, diminution of vision, contraction of the field, and hemeralopia.

Nor could either of the cases be identified with retinitis striata, since in that affection the stripes have a tendinous white color, and are in part accompanied by, or covered with, masses of black pigment, and vision is greatly affected.

I will not speak of the stripes which remain after the reattachment of a floating retina, since it has recently been thought that all cases of retinitis striata are to be regarded as the result of retinal detachment.[1]

A retinitis principally in the outer layers may well be supposed to be the cause of these pigment stripes. A considerable involvement of the choroid is not probable, since no changes indicative of it were found. The irregular mottling in the periphery in the first case, and the broad mottled ring in the second, can easily be considered the result of such a retinitis. I am unable to decide whether the pale yellowish-red spots in the second case are simply decolorized spots, or whether they are colloid excrescences of the membrana vitrea (see Fig. 3).

I am well aware of the insufficiency of this explanation that the changes are due to a retinitis, for this does not account for the arrangement of the pigment stripes. This leads me to suppose that the proliferation of pigment, or the original inflammation in the retina, has perhaps followed the lymph spaces described by Schwalbe and His. But as the existence of these lymph spaces has been questioned, this explanation must be given up.

A second possibility is that the changes in the eye that are observed in infants after birth may be the cause of this

[1] *Arch. f. Augenheilk.*, xxx., 1895, p. 122. This explanation of the genesis of typical retinitis striata is wholly untenable.—TRANSLATOR.

condition. Thus retinal hemorrhages are very frequent, and Naumoff has described an œdema of the retina that is often found. These changes might lead directly or indirectly to the condition we have described. In the former case we might suppose that the hemorrhages in process of transformation united, and that the pigment was then absorbed for the most part, remaining only in a narrow stripe. This explanation is supported by a case reported by Plange, in which the development of brown pigment stripes from retinal hemorrhages was followed with the ophthalmoscope.

There are two points which argue against Plange's explanation for my cases: first, the difference in color, the stripes in his case being brown, and in mine gray; and, secondly, the difference in the course of the disease, in Plange's case years being required for its full development, new hemorrhages occurring near the ends of the stripes, and the stripes thus becoming gradually longer.

In both of my cases the entire fundus would need to have been filled with hemorrhages. What could, then, have caused the blood to be arranged in such a remarkable form? It might be supposed that the blood pigment, in passing off, followed pre-existing channels, and in these some of the pigment remained.

It seems to me probable, however, that hemorrhages in part at least led indirectly to the final condition. We know that with neuritis a folding of the outer layers of the retina is brought about. Gowers described such folds as running concentrically to the disc, and states that in severe cases the folds may also run in a radiating direction. And as previously mentioned the retina in young infants is frequently filled with hemorrhages.

Whether the white patches seen in the first case and the black spots seen in the periphery in the second were due to hemorrhage I am unable to decide, although a hemorrhagic origin is possible.

I should like to mention here a THIRD CASE in which in one eye there was a branching stripe of gray pigment nearly surrounding the disc (Fig. 4). I think it probable that this ring is of similar origin, due to folding of the retina concen-

trically to the disc. There was also some choroiditis in the macula. $V = \frac{6}{18}$. Incorrectible astigmatism.

I would retain the classification of stripes in the retina which Dr. Praun[1] has given us, so far as its three chief forms are concerned. The further division of "retrovascular stripes" into those due to chorio-retinitis and those due to detachment of the retina I would drop, since it now seems probable that the cases of retinitis striata are the outcome of retinal detachment.

I would, however, add a new division, viz., retrovascular pigment stripes due to folding of the retina. I choose this designation because the last explanation seems the most plausible.

We would have then the following classification:

1. Prevascular stripes: Retinitis proliferans.
2. Perivascular stripes: Periarteritis.
3. Retrovascular stripes.
   (*a.*) Due to detachment of the retina.
   (*b.*) Due to folding of the retina.

In conclusion I wish to express my thanks to Prof. Fuchs for his kindness in giving me the cases, and to Dr. Salzmann for the excellent drawings which accompany this article.

[1] Praun, "Striæretinæ nach Netzhautabhebung." Deutschmann's *Beiträge zur Augenheilkunde.*

# OPHTHALMIC AND AURAL TRAVELLING NOTES.

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IN the rapid tour necessary for the American oculist who desires to see the work being done by his European colleagues, Dublin is often entirely neglected, or, at best, only receives a flying call of a few hours. It should not be forgotten, however, that the city presents, from the position which it holds in Ireland, many of the same advantages as London does for Great Britain, it being the metropolis for the five and a half millions on the island, and hence has a large population depending on its clinics and hospitals. The medical history of no other city can boast of greater names than can Dublin in nearly all of the departments of medicine. Graves, Stokes, Crompton, Jacobs, Wilde,—all practised among its citizens, and taught in its schools. Its ophthalmic infirmary was established in 1814, and has continuously existed from that time. This institution is now represented by the National Eye and Ear Infirmary on Molesworth Street. Toward the middle of the century the St. Mark's Ophthalmic Hospital was founded by Sir Wm. Wilde the eminent oculist and aurist. These two hospitals—having together a capacity of about one hundred beds—now desire to amalgamate, thereby very much enlarging their sphere of usefulness, as well as largely increasing their accommodations for patients, who now often have to wait not only for days, but sometimes for weeks, for a vacancy to occur to render their admission possible. In order to erect the necessary buildings and equip the same, the sum of £10,000 was found necessary to be raised. The urgency of the need, as well as

the generosity of the citizens, is shown by the response which they have made to the appeal to furnish the needed funds. A mammoth bazaar and fête was organized to be given in one of the suburbs for one week from May 19th. All classes, from the nobility to the peasantry, gladly contributed toward the beneficent object, and nearly £6000 was realized. This sum, with the funds already at the disposal of the boards of the two hospitals, approaches to within £1000 of that needed, so that the amalgamation of the institutions may be considered as an accomplished fact. At both the National and St. Mark's practical instruction is given in ophthalmology each winter in courses of three months each. These courses are given at the National Eye and Ear Infirmary by Dr. C. E. Fitzgerald and Mr. H. R. Swanzy, each lecturing on alternate days, supplemented by special afternoon classes in ophthalmoscopy by the assistant surgeons, Drs. Maxwell and Werner. It is to be regretted that no operative work on the cadaver is practicable, owing to the religious prejudice of the population. At St. Mark's Ophthalmic Hospital similar courses are given by Messrs. Story and Benson. Sufficient difference of opinion regarding the expediency of different modes of operation and treatment will be found among the surgeons, so that the visitor has the opportunity of forming his own judgments as to their respective merits. In the matter of cataract extraction, Mr. Fitzgerald—one of the pioneers in simple extraction—has seen no reason to change his opinion as to the desirability of that method in all but exceptional cases, from his extensive private and clinical practice—antedating that of any oculist in the city. His example is followed by the majority of the oculists here. On the other hand, Mr. Swanzy—whose authority as a teacher must be conceded by all familiar with his excellent work on diseases of the eye—always operates by the removal of the lens after a preliminary iridectomy.

The *peripheral capsulotomy*, which gives such satisfactory results in the hands of some of our ablest men, is not at all practised in Dublin.

At the National Infirmary only words of praise are to be

heard for the *removal of the transparent lens in cases of high myopia*, all the surgeons having had a number of cases, and all agreeing both as to the good visual results and also to the lack of disastrous consequences from the operations, not a single eye having been lost by the process. The method of operation has been discission, this being followed, in the few cases where increase of tension supervened, by an extraction; almost every lens, however, has been absorbed without threatening symptoms, leaving but seldom a secondary opacity of capsule requiring needling. This satisfactory showing seems to have placed the operation for interference in cases of high myopia when the fundus is in fair condition, on a firm basis here. It is needless to say that strict asepsis is practised, and Dublin may well be proud of the fact that not a single suppurative case has occurred in her National Infirmary after operation during the last six years. The number of cataract extractions made in the two institutions during the past year has been about one hundred and fifty,—a moderate number when we consider the large country which looks to this city for special work.

Trachoma is not so abundant in the clinics here as would be expected, when we remember its prevalence in the island in an epidemic form in former years, and the exceptionally good opportunity afforded to infection by the method of living of the lower classes, not only in the towns but also in the rural districts. I am credibly informed that the disease is decidedly on the decrease in both its occurrence and severity. Its treatment does not differ materially from that followed in New York, the bluestone on the whole giving the most satisfactory results.

The *aural work* of the city is done for the most part by the oculists. It seems as if the spirit of Sir Wm. Wilde still holds sway on the treatment of mastoiditis, and the celebrated "Wilde's incision" is performed for nearly all cases of that disease serious enough in their symptoms to require surgical aid. Not a single mastoid operation, as is so extensively practised in Germany and the United States, was done in either the National or St. Mark's during the past twelve months. Dr. R. H. Woods, however, at the House

of Industry Hospital, has opened the mastoid, and thoroughly cleaned out its antrum and accessory cavities with uniformly good results, in numerous cases, using latterly the dental burr in preference to mallet and chisel. This operator has also evacuated the pus in several cases of brain abscess with the most brilliant success. It may be of interest to your readers to read of what to me was a new plan of treatment for that most intractable of diseases—dry catarrh of the tympanic cavity, viz., the injection into the middle ear of three or four minims of liquid paraffin through the Eustachian tube by means of a Weber's canula. Dr. Woods informs me that he has done this—not, however, claiming the idea as an original one—in about twenty cases, all of whom show decided improvement in their hearing apparently in consequence. In closing, I would urge such oculists or aurists as are intending a summer excursion through the medical centres this side of the Atlantic, not to pass by the Irish capital without taking something more than a passing glance at its hospitals.

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DUBLIN, May 28, 1896.

# SYSTEMATIC REPORT ON THE PROGRESS OF OPHTHALMOLOGY IN THE FOURTH QUARTER OF THE YEAR 1895.

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WITH THE ASSISTANCE OF

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Translated by Dr. Ward A. Holden.

Sections I.–V. Reviewed by Dr. ST. BERNHEIMER.

## I.—GENERAL OPHTHALMOLOGICAL LITERATURE.

### TREATISES ON GENERAL, BIBLIOGRAPHICAL, AND HISTORICAL SUBJECTS. STATISTICAL REPORTS.

484. Hansen, Eiler. Statistics of blindness in Denmark. Copenhagen, 1895.

485. Bull, Ole. Perimetrie. Pp. 218, with 174 figures in the text. Fr. Cohen, Bonn, 1895.

486. Landolt and Gigax. An epitome of ocular therapeutics. Masson, Paris, 1895.

487. Albertotti. Libellus de conservanda sanitate oculorum, by Master Barnabas de Rigio. *Mem. d. R. Accad. di Scienza Lettere et Arti di Modena*, vol. xi., part ii., p. 339.

488. NEISSER. Stereoscopic medical atlas. A collection of photographs in all departments of clinical medicine, anatomy, and pathology. 1. Ophthalmology. Th. G. Fisher & Co., Cassel, 1895.

489. OHLEMANN. Ocular therapeutics for physicians and students. Bergmann, Wiesbaden, 1895.

490. DE LANTSCHEERE. On the examination of the vision of railway employees. Brussels, 1895.

490a. FESTSCHRIFT, in celebration of the seventieth birthday of Prof. v. Förster in Breslau, presented by his pupils. *Arch. f. Augenheilkunde*, vol. xxxi., supplementary number.

491. HOWE, L. Report of the committee on the prevention of blindness from ophthalmia neonatorum. *Journ. Amer. Med. Assoc.*, Nov. 9, 1895.

According to HANSEN (484), Denmark next to Belgium has the smallest quota of blind individuals, being in 1890, 6.7 to 10,000 inhabitants. Congenital blindness is frequent, amounting to 25 %. Ophthalmia neonatorum is responsible for 15 % and scrofula for 29 %. SCHIÖTZ.

OLE BULL'S (485) treatise is composed of two sections, the first on preliminary physiological considerations, the second on the visual field in pathological conditions. The first is chiefly a *résumé* of papers previously published by the author. Bull endeavors to defend his idea previously expressed that syphilitic retino-choroiditis begins in the retina, although the choroid may also be affected. In affections of the visual apparatus behind the ball, perimetry is of great importance since the ophthalmoscopic finding is often negative. He believes that scotoma scintillans is due not to contraction but to dilatation of the vessels of the cortex of the brain, just as phosphenes occur not with anæmia but with hyperæmia of the retinal vessels.

In atrophies of different origins the visual field is altered in many ways. The author believes that the light-sense constantly suffers and that its value is not proportional to that of the acuteness of vision, but to the extent of functionating field, which would seem to be a generally applicable fact. A marked diminution of perception of red and green as compared with yellow and blue is characteristic of a cerebral affection ; whereas when bright red and yellow appear darker than blue-green and blue, and red is confounded with yellow, and green with blue

(which happens under physiological conditions when the illumination is reduced), the coats of the eyeball are affected.

In the final chapter the author speaks of defects in the visual field with paralysis of the ocular muscles. In syphilitic paralyses contraction of the visual field was also found. SCHIÖTZ.

The monograph of Master Barnabas de Regio, discovered and published by ALBERTOTTI (487), consists of fourteen quarto pages and dates from the year 1340. It is of great historical value, as it reveals the medical views of that day and particularly those in regard to the eye, its functions, and the treatment of its diseases. DANTONE.

From this report of Chairman HOWE (491) we learn that in addition to the states of New York, Maine, and Rhode Island, which were the first to place a law regulating the practice in regard to ophthalmia neonatorum on their statute-books, the following have fallen into line: Minnesota, Ohio, Maryland, Connecticut, Missouri, New Jersey, Pennsylvania, and Illinois, embracing in all a poulation of over twenty-eight million people. BURNETT.

## II.—GENERAL PATHOLOGY, DIAGNOSIS, AND THERAPEUTICS.

492. ANDOGSKY. On some conditions of the development of post-operative suppuration in the eye. Experimental studies from the laboratory of the acad. clinic of Prof. Beljarminoff. Dissertation, St. Petersburg, 1895.

493 MULDER. On the transmission by inheritance of acquired eye-diseases. *Med. Weekblad*, ii., p. 520, 1895.

494. BACH. Experimental investigations on the importance of the pneumo-coccus in ocular pathology. *Arch. f. Augenheilkunde*, xxxi., p. 198.

495. EYRE. The xerosis bacillus. *Brit. Med. Journ.*, Dec., 1895, p. 1558.

496. DE SCHWEINITZ. Histologic and bacteriologic notes on three cases of penetrating wound of the eyeball and some observations on certain bacilli found in a case of post-operative ophthalmitis. *Journ. Amer. Med. Assoc.*, Oct. 26, 1895.

ANDOGSKY (492), making cultures of the staphylococcus aureus on the different media of the eye, found that the lens substance was a particularly good culture medium, while the aqueous and the vitreous prevent the growth of colonies, at least for six to nine hours. His conclusions, after inoculating the anterior cham-

ber with staphylococci in normal eyes and in those in which discission and extraction of the lens and iridectomy had been made, were as follows: The operative wound *per se* is not the cause of severe purulent inflammation. The fate of the eye depends upon the quantity of staphylococci introduced and the favorable conditions produced by the operation. In normal eyes and in operated eyes in which the lens and zonula are uninjured, as much as 0.05 *ccm* of a one-day-old bouillon culture introduced into the anterior chamber does no harm. After infection of normal or iridectomied eyes with moderate amounts of staphylococci, there is a transient irido-cyclitis with a fibrino-cellular exudation. Larger quantities cause panophthalmitis. The latter result is obtained with a smaller inoculation after discission of the lens. Any infection of the anterior chamber after extraction with cortical masses remaining causes irido-cyclitis leading to chronic panophthalmitis. In eyes from which the lens has been extracted two or three months before, the posterior capsule being intact, the irido-cyclitis produced by infection does not lead to suppuration in the ocular membranes; but when discission of secondary cataract is done, panophthalmitis follows. A mild infection immediately after complete extraction or later causes a mild exudative iritis. The cocci remaining in the ball after any sort of suppuration are finally destroyed. HIRSCHMANN.

After enucleating the right eye of rabbits of successive generations for years, MULDER (493) has never seen a one-eyed rabbit born when the operation had been done aseptically. In case of infection, the young were born with various ocular inflammations. WESTHOFF.

EYRE (495) isolated this bacillus from cases which differed slightly from ordinary follicular conjunctivitis, also from cases of trachoma, but he was unable to find it in the normal conjunctiva. In some respects it resembles the diphtheria bacillus of Klebs-Loeffler, but differs in that (1) cultures do not appear for thirty-six to forty-eight hours; (2) reaction alkaline, if grown on broth or milk; (3) innocuous result of inoculation, etc. WERNER.

In all three cases reported by DE SCHWEINITZ (496) there was a typical uveitis of a sympathetic nature following penetrating wounds of the fellow eyes. Both bacteriologic and histologic examinations were made of the enucleated eyes. The important features of these examinations are (1) that in two no microorganisms were found; (2) inflammation of the ciliary nerves

especially marked in one case; (3) a marked constitutional disturbance in one case. The bacilli found in the case of post-operative panophthalmitis were rodlike bacilli, uniform in size, slightly rounded at the ends. They proved to be innocuous on experimentation. BURNETT.

### III.—INSTRUMENTS AND REMEDIES.

497. DE BONO. Again the endovenous injections of sublimate in ocular therapy. *Arch. di Ottalm.*, vol. iii., 3–4, p. 125.

498. LUCIANI. Ichthyol in some forms of eye-disease. *Ann. di Ottalm.*, xxiv., 5, p. 501.

499. NORSA. The balsams in the treatment of eye-diseases. *Boll. d'ocul.*, xvii., 15–16, p. 118.

500. PUCCIONI. Antisepsis in ophthalmic surgery with permanganate of potassium. *Riforma med.*, 133, June, 1895.

501. SEGAL. The detection of simulated blindness. *Wjestnik. ophth.*, 1895, No. 6.

502. SCHMIDT-RIMPLER. The use of strong electro-magnets for the removal of splinters of iron from the eye. *Berliner klin. Wochenschr.*, No. 40, 1895.

503. HENSEN. On a linear form of stenopaic glass. *Graefe's Archiv*, xli., 3, p. 258.

504. SHARP, GORDON. The atropine group. *Brit. Med. Journ.*, Dec., 1895, p. 1547.

505. MURRELL, T. E. The value of scopolamine hydrochlorate in testing refraction. *Annals of Oph. and Otol.*, Oct., 1895.

506. WÜRDEMANN. The infiltration method of anæsthesia in ophthalmic practice. *Jour. Amer. Med. Assoc.*, Nov. 16, 1895.

507. ZIMMERMANN. Practical points in anæsthesia for plastic operations about the eye. *Jour. Amer. Med. Assoc.*, Oct. 19, 1895.

508. JACKSON. Strength of the different mydriatics and myotics. *Jour. Amer. Med. Assoc.*, Oct. 19, 1895.

DE BONO (497) reports eight more cases of syphilitic eye-disease —irido-cyclitis, irido-choroiditis, neuro-retinitis, gumma of the iris and of the retina, and paralysis of the abducens from cerebral gumma, which were quickly controlled by intravenous injections of sublimate. The method is without danger, and 2 to 14 mgr. may be given at one dose.

LUCIANI (498) has used ichthyol. sulfo-ammoniacum in 1 to 10

% solutions, and in 2½ to 10 % salves in cases of blepharo-adenitis and of various corneal and conjunctival affections, with favorable results.

NORSA (499) has used in various ocular affections 1 to 3 % balsam of Peru and Culu in vaselin with good results. These salves are well borne and act in an anti-catarrhal and antiseptic way. They facilitate the cicatrization of corneal ulcers and the clearing up of corneal scars, and relieve pain. They are particularly serviceable in blepharo-adenitis. DANTONE.

To test the antiseptic action of permanganate of potassium, PUCCIONI (500) examined the conjunctival secretion of patients about to be subjected to cataract extraction or iridectomy, both before and after disinfection with this agent. In ten cases, the staphylococcus aureus was found eight times, the albus twice, and the streptococcus once. After disinfection the micro-organisms were present in much smaller number. He therefore believes that permanganate of potassium, which is unirritating in 1:4000 solution, is preferable to bichloride.

SEGAL (501) proposes the following methods of discovering simulated unilateral blindness: 1. Convex cylinders of 1 or 1.5 D. are put one axis vertical before one eye, and another axis horizontal before the other eye. If the patient with both eyes open sees as well as he previously did with his good eye, he is a simulator, for he sees the horizontal lines clearly with one eye and the vertical with the other, giving good binocular vision. 2. A weak + glass is placed before the good eye and a strong + glass before the one alleged to be poor, and the patient is directed to look at a distant flame. In case he sees a round disc and a natural flame, he is a simulator. 3. Plane or weak glasses dusted with lycopodium powder are held before the eyes, and the patient sees colored circles about the flame. The glass before the good eye is then wiped and replaced, and in case the patient still sees the colored circles he is a simulator.

SHARP'S (504) paper deals with the chemistry and physiological action of atropine, hyoscyamine, hyoscine, daturine, duboisine, and scopolamine. His conclusions are that daturine and duboisine are only impure atropine. The varying effects of hyoscine and scopolamine are probably due to the fact that they are not definite bases, but contain atropine and one of its conversion or decomposition products. Hyoscyamine, if not identical with, is closely related to, atropine. WERNER.

MURRELL (505) has used scopolamine hydrochlor. in the strength of $\frac{1}{10}$ of one per cent., and finds it on the whole a most satisfactory cycloplegic for refraction work. In that dose it is not toxic; one drop suffices as a rule; accommodation is completely paralyzed at the end of an hour, and the effect passes off in seventy-two hours at the furthest. BURNETT.

WÜRDEMANN (506) reports a favorable experience with Schleich's methods of local anæsthesia in the operation for chalazia and abscesses, and for plastic operations about the eyes. BURNETT.

According to ZIMMERMANN'S (507) experience the best anæsthetic for plastic surgery about the eye is ether and it should be pushed to profound anæsthesia. BURNETT.

In his introductory as President of the Section of Ophthalmology of the American Medical Association, JACKSON (508) gave the result of his investigation on the relative strength of the various mydriatics and myotics; and with the following results:

Taking homatropine as a unit the relative strength of the mydriatics and myotics appears to be pilocarpine (hydrochlorate) $\frac{1}{4}$, homatropine (hydrochlorate) 1, eserine (sulphate) 6, atropine (sulphate) 30, hyoscyamine (hydrochlorate) 75. BURNETT.

## IV.—ANATOMY.

509. BIETTI. On the distribution and termination of the nerve fibres in the choroid. *Ann. de Ottalm.*, xxiv., 2–3, p. 233.

510. BACH. 1. The nerve cells of the retina in normal and pathological conditions. 2. The human retina studied by the Golgi-Cajal method. *Graefe's Archiv*, xli., 3, p. 62.

BIETTI (509) describes a fine nerve arborization along the course of the choroidal vessels in Golgi preparations. Another fine network was found internal to the vessels of the chorio-capillaris, lying on the pigment epithelium.

BACH (510) examined by Nissl's method normal and pathological retinas of men and animals. His results confirm those of Nissl and refute those of Dogiel. In retinas that had been detached for some time marked changes could be found in the ganglion cells, similar to those described by Nissl in the ganglion cells of the facial nucleus. It seems probable that irreparable changes occur in the ganglion cells within two months after detachment.

## V.—PHYSIOLOGY.

511. LODATO. Researches on the physiology of the neuro-epithelial layer of the retina. Preliminary note. *Arch. di Ottalm.*, iii., 5–6, p. 141.

512. ANTONELLI. The ophthalmological works of Thomas Young translated into French with notes by Tscherning. Critical notice. *Ann. di Ottalm.*, xxiv., 2–3, p. 240.

513. GUILLOZ. On the equal size of the retinal image in emmetropia and in corrected ametropia. *Arch. d'opht.*, xv., No. 10, October, 1895, p. 633.

514. BARDELLI. Skiascopy. *Ann. d'ocul.*, cxiv., p. 401.

515. PRENTICE. Explanation of the fact that contrary lenses of equal strength do not neutralize each other accurately. *Ibid.*, p. 378.

516. KOSTER. On the currents from the posterior to the anterior chamber. *Tydschrift voor Geneeskunde*, vol. ii., p. 1125, 1895.

517. FELTEN, PETER. On difference in the size of the pupils when nerve and eye diseases are excluded. *Inaug. Dissert.*, Bonn, 1895.

518. GREEFF. Physiological observations. 2. Remarks on the binocular vision of squinting individuals. 3. On the worth of the lens in myopia. *Klin. Monatsbl. f. Augenheilk.*, xxxiii., p. 352.

519. OVIO. On the phenomenon of unequal accommodation. *Ann. di Ottalm.*, xxiv., 2–3, p. 876.

520. VON ZEHENDER. On some subjective visual perceptions. 4. The visibility of the circulation in the capillary vessels of one's own eye. 5. On the movement of the pigment granules in the layer of retinal epithelium in one's own eye. *Klin. Wochenschrift f. Augenheilk.*, xxxiii., pp. 339 and 379.

521. GUILLERY. On the spatial relations of the light- and the color-sense. *Arch. f. Augenheilk.*, xxxi., p. 204.

522. KOSTER. Investigations on the color-sense. *Graefe's Archiv*, xiii., 4, p. 1.

523. FRÖHLICH. In what conditions do double images appear to be at different distances from the observer? *Ibid.*, p. 134..

524. GOWERS. Subjective visual sensations,—being the Bow-

man lecture. (With plates and figures.) *Trans. Ophth. Soc. Unit. Kingdom*, xv., p. 1.

525. Weiland, Carl. What is the cause of the shadow in skiascopy? *Med. News*, Oct. 12, 1895.

526. Holden. Observations on cases of hemichromatopsia indicating the non-involvement of a separate cortical color-centre. These Archives, xxiv., 4.

Lodato (511) has made many experiments in regard to the condition of the retinal pigment after the use of atropine, eserine, and cocaine. Atropine causes no change; eserine a slight movement, as does white light; cocaine displaces the pigment, leaving the rods and cones in the position of rest, so that they do not react to light, an effect which is known to be produced by quinine. The author has also experimented on the action of various stains on the illuminated and shaded retina, and finds no differences in the two as regards the effect of aurantin, acid fuchsin, and the Biondi-Heidenheim fluid, but that eosin stains the retina that has not been exposed to light more intensely. Red light acts, as respects the staining with eosin, like darkness, and blue light or electric excitation like white light. Dantone.

Guilloz (513) shows that the size of the retinal images in emmetropic, and in axial ametropic eyes corrected by a glass at the anterior focal point, is not only the same in distant vision, but also in accommodation for near, and that therefore the acuteness of vision for distance and for near must be the same.

v. Mittelstädt.

Bardelli (514) criticises the various explanations of the shadow test, and concludes that Parent's theory is the true one. The schematic eye devised by Kühne was employed. According to the author, the pupil of the observed eye should be about 5 *mm* in diameter. Sulzer.

The thickness of the lenses is a factor usually disregarded. Prentice's (515) computations show, however, that for convex glasses stronger than 8. D. the thickness must be taken into account. While the thickness of the centre of concave glasses may remain constant for all numbers, that of convex glasses must necessarily increase with the increase in refractive power. This requires the radius of curvature of a strong biconvex lens to be greater than that of a concave lens of equal focal distance. When two such lenses are held together for neutralizing purposes,

the result is not a lens bounded by arcs of concentric circles, but a concave periscopic meniscus. SULZER.

In opposition to Knies' theory that the fluid in the posterior aqueous chamber passes through the iris to reach the anterior chamber, KOSTER (516) believes that he has proved by various experiments that in the normal eye the fluid passes through the pupil. WESTHOFF.

OVIO (519) has sought to determine whether the two eyes can exercise a different accommodative effort at the same time. After a discussion of the views of various authors and of his own experiments, he concludes that the existence of unequal accommodation cannot be proved. In the cases in which there is an apparent inequality, it is more rational to assume that other factors have come into play. Accommodation is a complicated act, and does not depend solely upon tension and relaxation of the ciliary muscle.

GOWERS' (524) paper deals in a masterly way with the subjective visual sensations in epilepsy and migraine, and their relation to the functions of the cerebral centres. The author is still confirmed in his opinion that in addition to the hemianopic centres in the occipital lobes, there exists, in the region of the angular gyrus, a higher centre (as indicated by Ferrier's experiments), which is connected with the two occipital centres in such a way that both fields of vision are represented, but that of the opposite eye in a greater degree. This high centre differs from the lower or occipital centre in two respects. First, partial disease lowers function as a whole, causing concentric contraction of the fields, mostly on the opposite side. Secondly, compensation by the opposite hemisphere is possible. This, and the fact that it is in the region of blood supply of two different arteries, may be the reasons why pathological evidence of this centre is scanty. Its existence is strongly suggested by the "crossed amblyopia" which occurs in hysteria, and has also been produced by organic disease. (See author's *Diseases of Nervous System*, vol. ii., 2d ed., fig. 83.) For peripheral vision the co-operation of both centres is necessary.

Visual sensations often constitute the "warning" of an epileptic fit. They may be preceded or followed by other sensations, and although very varied, are constant in the same patient. They may take the form of colored flashes, or objects, or be very elaborate, representing figures, scenes, etc. They are generally preceded by simple ones. In some cases, inhibition precedes dis-

charge. The colors seen are red, green, blue, or yellow. Sometimes transition from red to green occurs. This subjective color sensation seems to extend to the extreme periphery of the field. The author's investigations show that, normally, a six-centimetre square of red can be seen up to the limits of the field of vision—that, in fact, the field for all colors, with suitable test objects, is the same, green alone falling short by 5°. The radial dimension of the object seems more important than the concentric. With both eyes open the "binocular intensification" enlarges the fields for color, even in those parts which do not overlap, thus pointing to the blending of function in the two higher centres. The close relation of movements of the head and eyes to activity of the visual sensations in epilepsy is then shown. Micropsy and macropsy, owing to apparent advancing or receding of objects, are also observed.

A most interesting and detailed description of the visual phenomena associated with migraine is then given, accompanied by colored drawings and sketches made by the patients, including those of Dr. Airy. As an abstract of this portion of the paper would be useless without the illustrations, it will suffice to mention the chief varieties of form into which the "spectra" are grouped. They are: 1. The angled sphere; 2. The expanding spectrum; 3. The progressive curve; 4. The lateral spectrum; 5. The secondary limiting spectrum, and the concentric spectrum.

WERNER.

WEILAND (525) shows by geometrical demonstration that in skiascopy the light-area has exactly the shape of the patient's pupil, and remains stationary throughout the test, the shadow alone moving. The shadow is produced by the iris of the observer. Skiascopy is the more accurate, the larger the pupil of the patient and the smaller the pupil of the observer—a proposition which is not agreed to by all. BURNETT.

HOLDEN (526) examined cases of bitemporal and homonymous hemichromatopsia, and in every case found a diminution of the light-sense corresponding to the loss of color-sense. The light- and the color-sense thus vary together, and it is incorrect to suppose that in cases of hemichromatopsia there must be an involvement of a separate cortical color-centre, as has been claimed by Samelsohn, Landolt, and Wilbrand, and denied by Ole Bull and Dahms.

Sections VI.–XI. Reviewed by DR. HORSTMANN.

## VI.—ANOMALIES OF REFRACTION AND ACCOMMODATION.

527. DE BOURGAN. Subconjunctival injections of sublimate in cases of myopia with lesion of the deep membranes of the eye. *Annal. d'ocul.*, cxiv., p. 270.

528. OTTO. A contribution to the knowledge of the changes in the fundus of highly myopic eyes. *Report of 24th Meeting of German Ophth. Soc.*, 1895, p. 139.

529. SILEX. Report on the ophthalmological examination of the inmates of the orphan asylum in Rümmelsberg, April, 1895–April, 1896. Berlin, 1895.

530. DODD, C. W. Astigmatism of twenty-eight dioptries. *Oph. Record*, Dec., 1895.

531. STARKEY, H. M. Latent astigmatism. *Journ. Amer. Med. Assoc.*, Nov. 16, 1895.

532. ELLIS, H. BERT. A study of the refraction of 1700 eyes. *Ibid.*

533. RISLEY and THORINGTON. Symmetrical and asymmetrical meridians of the cornea in astigmatic eyes. *Ibid.*

534. ANTONELLI. The optical correction of patients operated on for cataract. *Ann. di Ottalm.*, xxix., 5, p. 467.

Encouraged by the good results of the subconjunctival injections of sublimate in complicated myopia, reported by Darier, Abadie, Veursman, Pflüger, Gessner, and others, DE BOURGAN (527) subjected a number of patients to this treatment and records their histories. His results were not favorable, and not even the opacities of the vitreous were influenced by the injections.

SULZER.

Among 335 children in the orphan asylum at Rümmelsberg SILEX (529) found 423 eyes normal, 95 hyperopic, 46 myopic, and 104 astigmatic.

DODD (530) records a case of corneal astigmatism of 28 dioptries as determined by the ophthalmometer, due to changes in the corneal curvature following trachoma. With $-12D.95° + 16D.5°$ vision was brought up to half the normal. BURNETT.

STARKEY (531) is convinced that astigmatism may be concealed by the accommodation, and has used with success the plan of developing the total amount of astigmatism by gradually increasing the

strength of the cylinder from the manifest degree until the full amount is discovered. BURNETT.

Of the 1700 eyes examined by ELLIS (532), 218 were H.; 504 H. astig.; 649 compound H. astig.; 48 M.; 89 M. astig.; 145 compound M. astig.; 47 mixed astig. In the astigmatic cases 741 had the axis at 90 (vertical), 240 at 180. The axes were not symmetrical in 201 eyes. Among the symptoms of asthenopia, headache occurred 527 times, dizziness 99 times, and "morbid nervousness" 127 times. BURNETT.

The statistics of RISLEY and THORINGTON (533) are based on the examination of 1300 eyes in private practice and 1200 in hospital practice.

Of simple M., 7 private, 25 hospital; simple H., 72 private, 253 hospital; minocular astig., 20 private, 94 hospital; binocular astig., 1151 private, 828 hospital. Symmetrical astig. homologous, 543 private, 559 hospital; heterologous, 151 private, 54 hospital. Asymmetrical astig. according to the rule 223 private, 126 hospital; against the rule, 87 private, 32 hospital. BURNETT.

ANTONELLI (534) speaks of the astigmatism following cataract extraction, and of the difference in optical value between a combined lens and an equivalent spherical lens and cylinder held together. For testing cataract patients he therefore advises the use of a test case containing spherical lenses from 8 to 18 D and also these sphericals combined with cylinders of 1, 2, 3, and 4 D. DANTONE.

## VII.—LIDS.

535. ALFIERI. The most recent questions as to the nature of chalazion. *Arch. di Ottalm.*, iii., 3–4, p. 77.

536. AUGSTEIN. On ectropion operations. *Centralbl. f. prakt. Augenheilk.*, 1895, p. 353.

537. v. WOLFFRING. On the mechanism of sarcomatous ectropium. *Arch. f. Augenheilk.*, xxxi., p. 319.

538. LAGLEYZE. A new operative procedure for entropion and trichiasis. *Arch. d'opht.*, xv., 10, p. 605.

539. TRANTES. A new operative procedure for trichiasis with entropion. *Rec. d'opht.*, 1895, p. 705.

540. BECKER. A contribution to the knowledge of lid tumors. *Graefe's Archiv*, xli., 3, p. 169.

541. SNELL. Nine cases of chancre of the eyelids and conjunctiva. *Trans. Ophth. Soc. Un. K.*, xv., p. 39.

542. JESSOP, W. H. Right eye, primary sore on both lids. *Ibid.*, p. 39.

543. SCOTT, K. (Cairo). Complete ankyloblepharon. *Ibid.*, p. 49.

544. STORY. The operative treatment of entropion and trichiasis. *Ophth. Rec.*, xiv., p. 369.

545. SINCLAIR. Abnormal associated movements of the eyelids. *Ibid.*, p. 307.

546. KNAPP. On the operative treatment of severe forms of entropium and trichiasis. *Journ. Amer. Med. Assoc.*, Oct. 19, 1885.

547. KEYSER. Enchondroma of the cartilages of the upper lid. *Ibid.*, Nov. 19, 1895.

548. JOHNSON, W. B. Transplantation of skin in plastic operations on the eyelid. *Ibid.*

549. MAY. On blepharitis. *Amer. Journ. of Ophth.*, xii., 1, 1895, p. 23.

550. ALT. A congenital tumor consisting chiefly of muscle and nerve tissue. *Ibid.*

ALFIERI (535) speaks of the conflicting views now held as regards the nature of chalazion, and reports on the histological examination of 26 cases. His conclusions are as follows: 1. On anatomical, experimental, and clinical grounds chalazion cannot be considered tuberculous. 2. The presence of a specific microbe had not been demonstrated and it is not probable that such a microbe exists, but he believes it is of infectious origin and caused by various microbes. 3. The pathological process starts in the Meibomian glands and from the periacinous zone, and is not a primary affection of the tarsus, as many have maintained.

DANTONE.

As an operation for ectropion AUGSTEIN (536) recommends the excision of the conjunctiva according to the method of Fukala. This alone is not sufficient in all cases, but this combined with elevation or shortening of the lid may bring about favorable results even in the most difficult cases. The V cut is recommended for raising the lid.

According to WOLFFRING (537) ectropium sarcomatosum arises from an affection of the tarso-conjunctival glands scattered through the region of the retrotarsal fold, and from disease of the deep tissues arising from this. The smooth fibres of Müller's

muscle cannot regain their normal function and the effect of the action of the levator palpebrarum upon the orbital margin of the tarsus is weaker than that upon the ciliary margin of the tarsus. Continued efforts to raise the upper lid loosen the connective tissue between the tarsus and the oblique layer of the levator, the latter becomes farther removed from the anterior surface of the tarsus, and the fibres of the orbicularis which follow the direction of traction of the levator are drawn upward, so that of necessity there follows an ectropionizing of the free margin of the lid.

BECKER (540) describes a tumor which was removed from the right upper lid of a man of fifty-four. In all probability it was a case of elephantiasis.

SNELL's (541) patients were from two and a half to fifty-five years of age. Five were females. In all the pre-auricular gland was enlarged. The mode of inoculation was doubtful. According to Bulkeley's work, *Syphilis in the Innocent*, chancres on the eyelids and conjunctiva form 4 % of the extra-genital chancres. Hill Griffith drew attention to the similarity of these with vaccinia pustules and tubercular ulcers. WERNER.

In JESSOP's (542) case, a child aged three, inoculation was produced by the father, who had mucous tubercles, sucking an abrasion caused by the child having fallen. WERNER.

The globe was atrophied in SCOTT's (543) case, and the patient was subject to attacks of swelling of the lids due to collection of muco-purulent retained secretion. WERNER.

STORY (544) does Van Millingen's operation, using sutures, and prefers it to all others. WERNER.

SINCLAIR (545) has observed six cases of association-movement, between the upper eyelid and the lower jaw. Analysing and grouping the cases on record, he places them as follows: *Series I.* Movements of lower jaw with upward movement of upper lid; there is usually unilateral congenital ptosis. The drooping lid cannot be raised voluntarily, but only with certain movements of lower jaw. These cases fall into four groups: 1. One-sided congenital ptosis, in which lid is raised when mouth is opened (digastric ?), and also when lower jaw is directed to opposite side (ext. pterygoid)—13 cases. 2. Eyelid only raised on depressing lower jaw (13 cases). 3. Eyelid raised only on lateral movement of jaw (2 cases). 4. Similar associated movements without ptosis (4 cases). The associated movement is more common on the left side. *Series II.* Contraction of the levator palpebræ

superioris with contraction of the rectus internus. Four cases, in all of which the levator and int. rectus also relax together. *Series III.* Paralysis or paresis of one external rectus in which inward movement of the affected eye is associated with contraction of the orbicularis, and retraction of the globe. Five cases are here for the first time recorded. In all the left eye was the one affected. In three cases there was some weakness of the internal rectus as well. In one case there was permanent enophthalmos. A satisfactory explanation of these cases is still wanting.

WERNER.

After trying many entropium operations KNAPP (546) in 1890 adopted the Jaesche-Arlt method combined with the implantation of a skin flap (Waldhauer) or a flap of mucous membrane (Van Millingen). He refers to a description of the operation by Smith (these ARCHIVES, 1887,) which led him to try this operation, which gives him better results than any other, even in extreme cases.

KEYSER (547) reports a case of what seems to be an enchrondroma springing from the tarsus of the upper lid. It was of slow growth and recurred several times after a partial excision. The patient was a woman and fifty-eight years of age when first seen.

BURNETT.

JOHNSON (548) reports a case of transplantation of skin after the method of Wolfe for deformity of right upper eyelid. The opening was $1\frac{5}{8}$ by $\frac{1}{8}$ inches, and was covered with a flap 2 by 1 inches. Some weeks after the operation there was no shrinking of the flap, and the result was considered successful.

BURNETT.

ALT'S (550) patient, a boy of eleven, had a swelling beneath the left upper lid, coming on six months after typhoid fever. The eyeball was displaced downward. The tumor extended back an inch into the orbit and was adherent to the periosteum. When examined after removal its periphery was found to consist of striped muscular fibres with a small amount of connective tissue and its centre of nerve fibres irregularly arranged.

BURNETT.

## VIII.—LACHRYMAL APPARATUS.

551. DUCLOS. Treatment of dacryocystitis with fluoral. *Annal. d'ocul.*, cxiv., p. 302.

552. EWETZKY. Actinomycosis of the lachrymal canal. *Medic. Obosrenize*, xliv., No. 23, 1895.

553. Dürr. On a simple method of destroying the tear sac. *Arch. f. Augenheilk.*, xxxi., p. 195.

554. Bistis. Traumatic hernia of the orbital lachrymal gland. *Annal. d'ocul.*, cxiv., p. 457.

555. Piazza. Adenoma of the lachrymal gland. *Ann. di Ottalm.*, xxiv., Nos. 2–3, p. 246.

Fluoral, a bluish-white, odorless salt, soluble in 25 parts of water, prevents decomposition and the development of pus organisms when used in 1 % solution. The use of ½ % solution by Duclos (551) in dacryocystitis cases has invariably been followed by a quick recovery. It has the advantage over other antiseptics and astringents that it does not irritate the conjunctiva and it causes no pain. It is but slightly toxic.

Concretions removed from the lower canaliculus proved to be of actinomycotic origin. Ewetzky (552) regards the innocuousness of this fungus in the canaliculus as due to the fact that it develops slowly on the unbroken conjunctiva and cannot enter the tissues. Hirschmann.

In destroying the tear sac Dürr (553) makes an incision 2.5 *cm* long through the middle of the palpebral ligament, beginning 5 *mm* above it in order to open the upper end of the sac sufficiently. The knife is then elevated and carried down to the nasal duct, the mucosa of the canal is split and its strictures divided; 0.1 gr. of Vienna caustic paste is then pushed deep into the sac, left for a minute and a half, then removed and the cavity packed with lint to prevent hemorrhage. In twelve days the wound is healed and the results are satisfactory.

Bistis (554) saw a traumatic prolapse of the orbital lachrymal gland in an infant of one year which had fallen on a sharp stone. There was also exophthalmus. The gland was replaced and the lid wound closed, with good result. Sulzer.

Piazza (555) removed a tumor of the lachrymal gland the size of an almond. Histological examination showed it to be a simple adenoma, as it had been previously diagnosed. Dantone.

## IX.—MUSCLES AND NERVES.

556. Landolt. Clinical observations on the surgical treatment of strabismus (continuation). *Arch. d'opht.*, xv., No. 12, p. 721.

557. Pick. Demonstration of a case of peculiar disturbance

of function of the extrinsic muscles. *Prager med. Wochenschr.*, No. 49, 1895.

558. KARPLUS. On periodic paralysis of the oculomotor nerve. *Wiener klin. Wochenschr.*, Nos. 50–52, 1895.

559. BLOCK. Caput obstipum from paralysis of an ocular muscle. *Med. Weekblad*, ii., 1895.

560. STRAUB. Facial tic cured by operation. *Tydschrift voor Geneeskunde*, ii., p. 1174, 1895.

561. GRAEFE. The neuropathic nature of nystagmus. *Græfe's Arch.*, xli., No. 3, p. 123.

562. BEARD, C. A. Squint. With special reference to its surgery. *Amer. Journ. of Ophth.*, xii., 4, p. 97.

563. COLEMAN, W. F. An argument for amblyopia exanopsia in convergent squint. *Annals of Ophth. and Otol.*, iv., No. 2, p. 157.

564. PRENTICE, C. A new operation for the advancement of the recti. *Ibid.*, p. 128.

565. BULL, C. S. Preliminary report on six hundred and twelve cases of convergent squint with special reference to the final results of operation. *New York Med. Journ.*, 1895, No. 8, p. 236.

566. DUANE. Diplopia in the periphery of the field of fixation and its bearing on the diagnosis of muscular paralysis. These ARCHIVES, xxiv., p. 4.

567. BEEVOR, C. E. Ophthalmoplegia externa without other symptoms. *Trans. Oph. Soc. Un. Kingdom*, xv., p. 242.

568. SPICER, W. T. H. Contracture and other conditions following paralysis of ocular muscles. *Oph. Hosp. Reports*, xiv., 1, p. 220.

569. MCKEOWN. Advancement of the recti muscles. *Brit. Med. Journ.*, Dec., 1895, p. 1611.

570. BRUNER, W. E. Traumatic paralysis of the external rectus. *Annals of Oph. and Otol.*, Oct., 1895.

571. THEOBALD. The slight effect sometimes obtained as a result of free tenotomies of the ocular muscles for heterophoria. *Journ. Amer. Med. Assoc.*, Nov. 2, 1895.

572. STEVENS. Slight effects of tenotomies of the ocular muscles and what are the indications and advantages of tendon contractions. *Ibid.*

573. THOMAS, C. H. Tendon advancement and tendon retroplacement. *Ibid.*

574. SAVAGE. The indications for and the advantages and technique of muscle shortening. *Ibid.*

575. WOODS, HIRAM. To what extent should recently suggested systems of muscular exercise displace tenotomy in the treatment of heterophoria? *Ibid.*

576. PARK, J. WALTER. Practical points gained in the treatment of one thousand cases of insufficiencies of ocular muscles. *Ibid.*, Nov. 9, 1895.

577. GRADLE. What nerves give rise to the sensation of photophobia? *Annals of Ophth. and Otol.*, Oct., 1895.

LANDOLT (556), in the continuation of his paper, reports further experiences with advancement in cases of insufficiency of the interni, as well as in concomitant and paralytic squint. Only when there is a marked excess of divergence may a tenotomy be made for insufficiency of the interni; otherwise, as is sometimes found, there is produced a convergent squint for distance without a correction of the insufficiency for near.

In such a case it would be necessary to advance the tenotomized externus, and also to advance the internus of the other eye. In most cases the advancement of an internus is sufficient to relieve the insufficiency, and does not limit the abduction. Landolt cites cases in which this favorable result remained unchanged five years after the operation.

Divergent strabismus, when excessive, requires bilateral advancement, which brings about a normal power of convergence that is never secured by simple tenotomy. A combination of this and tenotomy is only indicated when one eye is amblyopic or in paralytic divergent squint.

Landolt finds tenotomy indicated less and less frequently as he is able, by the excision of a portion of the tendon and by sutures, to accurately gauge the effect desired. v. MITTELSTÄDT.

In a patient with hysterical stigmata, but no symptoms of Basedow's disease, PICK (557) found unusual disturbances in the function of the extrinsic muscles. In looking straight forward a zone of the sclera, several millimetres broad, is exposed above the cornea by a marked retraction of the upper lids. In looking down, the upper lid follows the eye only a short distance, and is then drawn up again by a spasm. This case of undoubted spasm of

the elevator of the lid indicates that the less marked but similar symptom of Basedow's disease is to be explained in the same way. In this patient the movements of the extrinsic eye muscles, while free, seemed to be checked at first, as if some obstacle had to be overcome, suggestive of the well-known symptoms of Thomson's disease. In this connection it is interesting to note that Raymond, in a case of this affection, also found the symptom previously mentioned. HERRNHEISER.

KARPLUS (558) reports two cases of periodic oculomotor paralysis. One patient was a woman of thirty-seven, who had had such attacks since her eighth year. The first and second branches of the trigeminus were involved at the same time. The second patient was a woman of forty-one, who had had the attacks since her sixth year. The patient died, and a small neuro-fibroma was found in the right oculo-motor nucleus.

A paresis of the left superior oblique caused BLOCK'S (559) patient to keep his head turned to the side. Tenotomy of the right inferior rectus relieved the difficulty. WESTHOFF.

STRAUB'S (560) patient had constant clonic spasm of the lids of the right eye and of the muscles of the mouth. After the failure of correcting glasses, galvanic current, bromides, atropine, cocaine, and stretching of the facial nerve, he cut through the orbicularis at the outer commissure, and applied a bandage without suturing the wound. The twitching of the lids has remained cured for eight months; that of the mouth persists. WESTHOFF.

Since the views as to the etiology of nystagmus are contradictory, GRAEFE (561) proposes "with all reserve" the following theory: Since there is always amblyopia, the visual centre in the brain receives only imperfect excitations, and therefore it can convey only a subnormal stimulation to the centre governing ocular movements, which centre then reacts with tremulous movements not controllable by the will. A neuropathic lesion is not always previously present.

DUANE (566), in controverting the criticism of his paper on "Paralysis of the Superior Rectus" by Dr. Alling, points out that the kind of physiological diplopia considered by the latter, and recognized by all authors as occurring in the periphery of the field of fixation, is entirely different from the pathological diplopia present in the cases which he himself described. Careful re-examination of these cases has confirmed the diagnosis in all but one or two; and these few, in which the diagnosis was

uncertain, are made up for by a greater number, examined since, in which the presence of a paresis of the superior rectus was indisputable.

In cases where the conjunctiva is weak, McKeown (569) leaves a small portion of the tendon attached to the eyeball, and passes a suture through this and the overlying muscle.

Werner.

Bruner (570) adds another to the list of cases of traumatic paralysis of the external rectus. As a result of the injury there was serious permanent impairment of hearing on that side, and there was undoubtedly fracture of the temporal bone. The paralysis of the external rectus passed entirely away in the course of three months. Burnett.

Theobald (571) gives the histories of two cases, among others of the same kind which he has seen, in which after a complete tenotomy of both internal recti muscles the heterophoria remained the same. Burnett.

The principal portion of this paper (572) is taken up with an explanation of why the tenotomy of a lateral muscle does not always produce the effect expected. This is due in Stevens' opinion to the fact that many cases of esophoria and esotropia, as well as exophoria and exotropia, are due, not to anomalies in the lateral muscles, but to unbalance in the vertically acting muscles. In such cases the relief to the hyperphoria brings also a correction of the lateral deviating anomaly. The amount of movement of the eye in all directions should be taken, and this is best done by means of the tropometer, an instrument of his own device, which, however, is not there described in detail or figured. Burnett.

In tendon advancement Thomas (573) follows the method described by Stevens—tacking the detached end of the tendon down to the sclerotic by means of a fine suture passed into its substance. The conjunctival wound is made very small. Burnett.

In answering this question Woods (575) thinks Gould's method of "handicapping" with prisms an excellent means of developing the interni when the externi are abnormally strong. It is not useful in developing abduction in esophoria, nor in hyperphoria. Savage's system of "rhythmical" exercise is much better adapted to the latter forms of muscular anomaly, and to those cases where all the muscles seem to be abnormally weak. In high degrees of esophoria and exophoria, and in hyperphoria above 3°, an operation he considers called for. Burnett.

The general tenor of the paper by PARK (576) is to the improvement of the general health by tonic measures, out-of-door exercise, etc., in insufficiencies. Only a small percentage of such cases he thinks should come to an operation. Of course, all dioptric anomalies should be corrected. BURNETT.

GRADLE (577) relates the history of a case of a man who had an eye totally blind from optic-nerve atrophy, yet in whom there was a painfulness on exposure of that eye to light during an attack of keratitis. In view of this fact, and many others of an analogous character, the author thinks the fifth nerve and not the optic nerve, the one which is at fault in photophobia.

BURNETT.

## X.—ORBIT AND NEIGHBORING CAVITIES.

578. CHAUVEL. Affections of the orbit and brows. *Rec. d'opht.*, No. 11, p. 648, 1895.

579. PERGENS. Phlegmon of the orbit complicating influenza. *Annal. d'ocul.*, cxiv., p. 279.

580. SALVA. Inflammatory complications in the orbit in cases of inflammation of the maxillary sinus. *These de Paris*, 1895.

581. VAN DUYSE. Contributions to the study of the endotheliomata of the orbit (angiosarcoma of Koloczek). *Arch. d'opht.*, xv., 11–12, pp. 613 and 664.

582. HENNEBERT and COPPEZ. Exophthalmus due to a syphiloma of the pterygo-palatine fossa. *Annales de dermat. et de syphilog.*, March, 1895.

583. BOUVIN. Pulsating exophthalmus. *Med. Weekblad*, ii., p. 521.

584. BURELL-THOMPSON. Foreign body in orbit: the bill of a fish. *Br. Med. Journ.*, p. 1422, 1895.

585. DOMBROWSKI. A case of primary carcinoma of the sphenoidal sinus. *Amer. Journ. of Ophth.*, xii., 8, p. 225.

586. SWANZY and PANAS. Discussion on the diagnosis of orbital tumors. *Br. Med. Journ.*, p. 958, Oct., 1895.

587. BULL, C. S. Some unusual cases of orbital tumors, emphasizing the necessity of careful differential diagnosis. *N. Y. Med. Journ.*, Nov. 16, 1895.

588. FOX, L. WEBSTER. Evisceration of the eyeball. *Journ. Amer. Med. Assoc.*, Oct. 26, 1895.

589. AYRES S. C. Lymphangioma cavernosum of the orbit. *Ibid.*, Nov. 9, 1895.

590. JOHNSON, W. B. Removal of the superior maxillary bone for sarcoma, involving the cerebral and orbital cavities and the antrum of Highmore. *Ann. of Ophth. and Otol.*, Oct., 1895.

591. CHURCHMAN, V. T. Pulsating exophthalmus. *Ibid.*

The "ophthalmological studies" of CHAUVEL (578) contain a series of very concise, interesting observations. They form in their *ensemble* documentary statistics of the eye department of the great military hospital of Val de Grace. A sword injury of the orbit had the following unusual course: The patient was struck beneath the right eye with the button of a foil. He complained of pain, but continued fencing. A quarter of an hour later he became unconscious, and vomited. A wound was found in the lower lid 1 *cm* from its margin. Exophthalmus, pulse 48, involuntary passage of urine and fæces. The following day there was alternating somnolence and excitability. On the seventh day the pulse became 62. Complete recovery in three weeks.

PERGENS (579) observed three cases of orbital abscess with influenza. In two the patients died and in one of these an autopsy was made. Inoculation of mice showed that there had been no erysipelas. None of the patients had suffered previously from conjunctival, lachrymal, nasal, or sinus affection. In the first case cultures showed the presence of the pneumococcus associated with the staphylococcus aureus; in the second case, the staphylococcus albus and aureus; and in the third, the bacillus pyocyaneus and the staphylococcus albus. The early evacuation of the abscess did not prevent the development of purulent meningitis in the two fatal cases. At the autopsy the main seat of the caries was found to be the ethmoid. SULZER.

VAN DUYSE (581) records three observations of endothelioma of the orbit with the clinical picture of relatively slow growth, moderate extension, and rapid recurrence. In one patient, a woman of fifty-six, the tumor developed near the left lachrymal gland, and the recurrent growths passed into the neighboring cavities and reached the brain. The structure of the tumor varied in different parts. An alveolar structure alternated with tubular, while in other places the picture was that of small-celled sarcoma, or of epithelial carcinoma, or of true glandular carcinoma. This great similarity between carcinoma springing from glandular epithelium and the endotheliomata springing from the

endothelium of the lymph- and blood-vessels and the lymph-spaces, may often lead to confusion in the description of these tumors. The author explains with a number of drawings the numerous microscopic details, and speaks of the nature and origin of these tumors which are found particularly in the orbit, and of the various forms with reference to the numerous names which have been given to the tumors by various authors, such as angiosarcoma and the like. He considers the term "endothelial sarcoma" a proper designation for the tumors arising from the endothelium of the blood- and lymph-vessels. v. MITTELSTÄDT.

The syphiloma observed by HENNEBERT and COPPEZ (582) was situated in the right maxillary antrum, the middle turbinate, and the pharynx. The tumor produced marked exophthalmus. A loss of substance in the posterior portion of the middle turbinate allowed a diagnosis of syphilis to be made in spite of a negative history. Anti-syphilitic treatment for three months caused an improvement in the symptoms which at first seemed to demand a resection of the upper jaw. SULZER.

SWANZY (586) gives a very good summary of the points to be considered in the diagnosis of orbital tumors, under the headings of displacement, pain, movement of globe, pulsation, consistence, etc.

PANAS deals with pseudo-malignant tumors of the orbit and refers to cases cured by mercury or iodide of potassium, which had been regarded as malignant. Cure by these drugs does not necessarily imply syphiloma. He believes that a number of neoplasms supposed to be lymphomas, sarcomas, or syphilomas are due to dyscrasia produced by auto-intoxication. A case of double exophthalmia is related which was cured by *arseniate of soda*, but rendered worse by potassium iodide. A summary of Dr. Delbet's work on the experimental production of lymphadenoma by inoculation of a particular bacillus is given. Bilateral enlargement of the lachrymal glands may be due to infection in gonorrhœa, eruptive fevers, influenza, mumps, syphilis. In one case Panas discovered a tonsillitis to be the source of acute dacryoadenitis. WERNER.

The first of these interesting cases whose histories are given in detail by BULL (587) is that of an abscess of the ethmoid cells, which the appearance, feeling, absence of any nose trouble and family history led him at first to believe was malignant. Case 2 was an adeno-sarcoma of the lachrymal gland in a man of thirty-

five years, which was removed. Case 3.—Fibro-sarcoma of the lachrymal gland in a boy of fourteen years, who died two years later from anæmia and exhaustion. Case 4.—Myxo-sarcoma of the sphenoid, ethmoid, and orbit in a woman of fifty-six, who died from a return of the growth in the orbit in about a year after the operation. Case 5.—Malignant tumor of the anterior cerebral fossa and orbit in a woman of forty-three. Case 6.—Sarcoma of the dura mater and orbit in a woman of thirty-two years. Case 7.—Cystoid angioma of the orbit in a man of twenty-two years, caused by a trauma. Electrolysis was tried and with temporary effect. The eye was afterwards enucleated and the tumor removed. The author now thinks that a continuance of the electrolytic treatment might have caused the tumor to shrink.

BURNETT.

FOX (588) reports six cases in which he had done Mules' operation with success and with a better result as to the wearing of an artificial eye than by enucleation. BURNETT.

AYRES' (589) patient was a man of fifty-three, who noticed a right exophthalmus coming on for three years. At the end there was much pain in the head and mental hebetude. There was choked disc ; vision almost gone ; the motion of the eye upward was limited, and it was slightly divergent. An exploration revealed a soft tumor around the nerve and in the muscular funnel. The tumor and eye were taken out together. The tumor measured 35 *mm* in length, 22 *mm* in diameter at the outer end, and 11 *mm* at the inner end.

A microscopical examination by Dr. Griewe showed it to be that rare form of tumor—a lymphangioma cavernosum. The tumor was composed for the most part of lymphoid cells, large and small. The cavities were lined with imperfect layers of endothelium, and in these cavities there were many loose lymphoid cells. No blood-vessels ; no glandular formation. The patient made a happy recovery, and the head symptoms disappeared. BURNETT.

JOHNSON'S (590) case was a girl of ten years, in whom an exophthalmus on the right side was noticed shortly after a blow on the right cheek. This increased rapidly, and a new growth appearing in the right nostril, led to the diagnosis of trouble in the antrum or ethmoid. An operation was undertaken in which the right half of the superior maxillary bone, the eyeball, and the new growth contained in these cavities were removed.

The focus of the disease was found to be in the ethmoid which was softened and diseased. This was removed and the dura exposed. Some thick yellow pus was discharged from the cerebral cavity. The patient lived two days after the operation. The brain tissue was healthy but the membranes were inflamed. The tumor was a round-celled sarcoma. BURNETT.

CHURCHMAN'S (591) case of pulsatory exophthalmus was in a woman of forty-four years who gave no history of a trauma. There was a severe neuralgia preceding the appearance of the proptosis, and noises in the ears. There was paralysis of the third nerve on that side (the left), vision $\frac{20}{60}$, retinal veins tortuous, a distinct bruit heard over the eye on auscultation. There was also paralysis of external rectus of the right eye. Left common carotid ligated, and all the symptoms disappeared with restoration of perfect vision in the course of two months. BURNETT.

## XI.—CONJUNCTIVA, CORNEA, SCLERA, ANTERIOR CHAMBER.

592. STEFFAN. On the etiology of conjunctival catarrh. *Zehender's klin. Monatsbl.*, xxxiii., p. 457.

593. SNELLEN. A new diagnostic medium of inflammation of the conjunctiva. *Med. Weekblad*, ii., p. 521.

594. PES, ORLANDO. On the etiology and therapy of some forms of pseudo-membranous conjunctivitis. *Arch. f. Augenheilk.*, xxxii., p. 33.

595. GUTTMANN. A case of diphtheritic conjunctivitis presenting unusual complications treated by antitoxin. These ARCHIVES, xxii., 4.

596. COPPEZ (fils) and FUNK. General statistics of the cases of ocular diphtheria treated by antitoxic serum. *Arch. d'opht.*, xv., 5, p. 687.

597. NESNAMOW. Iodine in trachoma. *Wratsch*, 1895, No. 47.

598. LEBER. Conjunctivitis petrificans, an unusual form of conjunctival disease. *Report of the 24th Meeting of the German Ophthalmological Society*, 1895, p. 46.

599. BASSOLINO and HALLONER. A case of subconjunctival angioma. *Graefe's Archiv*, xli., 3, p. 186.

600. ISCHREYT. On the pathological anatomy of the polypoid tumors of the conjunctiva. *Arch. f. Augenheilk.*, xxxii., p. 57.

601. HIRSCHBERG. Filaria removed from the human eye. *Berliner klin. Wochenschr*, 1895, No. 44.

602. BLACK, G. MELVILLE. Angio-neurotic œdema of the ocular conjunctiva. *Ophth. Rev.*, xiv., p. 320.

603. JESSOP, W. H. Case of sudden severe hemorrhage from conjunctival surface of upper lid. *Trans. Ophth. Soc. Un. K.*, xv., p. 64.

604. HARTRIDGE. Osteoma of the conjunctiva. *Ibid.*, p. 57.

605. JESSOP. Two cases of membranous conjunctivitis in which Loeffler's bacillus was found; treatment by antitoxin. *Ibid.*, p. 55.

606. GUTTMANN. A case of diphtheritic conjunctivitis presenting unusual complications, treated by antitoxin. These ARCHIVES, xxiv., 4.

607. GRADLE. The palpebral form of spring catarrh. *Ibid.*

608. AYRES, S. C. Dermoid tumors of the conjunctiva. *Amer. Journ. of Ophth.*, xii., 10, p. 289.

609. ROBERTSON. A case of filaria loa, in which the parasite was removed from the conjunctiva. *Trans. Ophth. Soc. Un. K.*, xv., p. 137.

STEFFAN (592) believes that many cases of obstinate conjunctivitis are caused by small adenomata near the lid margin, and are cured by the removal of these.

SNELLEN (593) has found that 3 per cent. pyrozon on the diseased conjunctiva causes swelling, with the presence of pus and lymph cells, but does not affect the healthy conjunctiva. It has no remedial effects. WESTHOFF.

PES (594) observed four cases of pseudo-membranous conjunctivitis, two croupous forms with severe symptoms, and two with mild symptoms. In three cases Loeffler's bacillus was found. Antitoxin was efficacious in all. When it was used the pseudo-membranes and the bacilli rapidly disappeared. In one case in which only the staphylococcus aureus was found, the antitoxin was of service.

An infant of thirteen months was brought to Knapp's clinic and referred to Dr. GUTTMANN (595) for treatment. Five days after the onset of measles, diphtheritic conjunctivitis appeared in the left eye, and there was diphtheritic infiltration of the cheek about a scratch. Five *ccm* of Behring antitoxin No. 2 were injected, but the process continued and the nose and throat became

affected. Four days after 10 *ccm* of antitoxin were injected. The infant died some days later. Not even a transitory beneficial effect could be ascribed to the antitoxin. GREEFF.

COPPEZ and FUNK (596) have used antitoxin in seven cases of diphtheria of the conjunctiva, and retain their former favorable views of this treatment. The injections must be made as early as possible before the cornea is involved in a streptococcus infection. V. MITTELSTÄDT.

In order to use pure iodine in ocular therapy NESNAMOW (597) combines it in 1.5 per cent. with ol. vaselini alb. and brushes this on the conjunctiva in cicatricial trachoma. HIRSCHMANN.

HIRSCHBERG'S (601) patient, a negro, had a filaria in the conjunctiva, which was removed, after which the swelling of the eye subsided.

BLACK'S (602) patient, a waiter, æt. thirty-two, suffered from constipation and some stomach derangement. Urine scanty, large quantity of lithates. His eyes felt irritable for twenty-four hours, and this was followed by severe pain in the eyes and along the supra-orbital nerves, the eyelids became swollen and red, a fold of yellow œdematous conjunctiva protruded above and below the cornea, there was absolutely no discharge, but great photophobia. In three days recovery took place. Iced applications and 2 per cent. antipyrin drops were used. The case was similar to one recorded in the *Trans. Amer. Ophth. Soc.*, vol. vi., p. 415, as "bilateral inflammation of Tenon's capsule in connection with profuse mercurial poisoning," except that there was no exophthalmos in the author's case. In vol. xxi., these ARCHIVES, p. 259, a case is recorded of chemosis from injection of a grain of quinine, and on p. 149, a case of "diffuse lymphoma of the conjunctiva" by Geraita is reviewed; both these are very similar cases. The author regards his case as one of angio-neurotic œdema, being analogous to circumscribed œdema occurring on other parts of the body, which is supposed to be a form of urticaria. [Cases somewhat similar to the author's have been recorded under the name of "fugitive œdema of the lids," by Jonathan Hutchinson. The reviewer has observed a case of unilateral chemosis with protruding yellowish-red rolls of conjunctiva, in a patient with albuminuric retinitis in both eyes, and without any œdema of other parts.—L. W.] WERNER.

JESSOP'S (603) patient, a woman æt. twenty-seven, had repeated severe hemorrhage from the left eye, to such a degree that it in-

duced collapse. Bleeding was stopped by clamp and actual cautery applied to a small ulcer 1½ *mm* in diameter on upper palpebral conjunctiva. There were slight nævoid changes in the lid. Three recorded cases are mentioned. WERNER.

The tumor in HARTRIDGE'S (604) patient was congenital, situated between superior and external recti and resembled an incisor tooth in shape. It was formed of true bone with a fibro-cellular investment. In nine other cases the osteoma occupied the same locality and exhibited the same characteristics.

[A similar case, omitted by Hartridge, is described by Galtir, *Annales d'ocul.*, Bd. cxiii., p. 186, who states that only three cases exist in the literature!—L. W.] WERNER.

JESSOP'S (605) patients were both infants, and had well marked membranous conjunctivitis; cornea not affected. In one there was also a membrane on the uvula, from which as well as from the conjunctiva cultivations of Loeffler's bacillus were obtained. The membrane melted gradually away in Case 1 in eighty hours (three injections of 3 iss of antitoxin), and in Case 2 in eighty-four hours (two injections of 3 i each). The author would call all cases of conjunctivitis with membrane, membranous conjunctivitis, and would recognize diphtheria, characterized by Loeffler's bacillus, as one of the causes. WERNER.

610. UHTHOFF. Further reports on the bacteriology of purulent keratitis in man. *Berl. klin. Wochenschr.*, No. 47, 1895.

611. ZIMMERMANN. On the cauterization of serpent ulcer. *Report of the 24th Meeting of the German Ophthalmological Society*, p. 126, 1895.

612. ZINN. A new method of treating hypopyon keratitis. *Wiener klin. Wochenschr.*, Nos. 44 and 47, 1895.

613. CZERMAK. Remarks on Zinn's paper; a new method of treating hypopyon keratitis. *Ibid.*, No. 46.

614. v. KORFF. On serpent ulcer of the cornea. *Inaug. Dissert.*, Kiel, 1895.

615. BAQUIS. Contribution to the knowledge of amyloid degeneration of the cornea. *Ann. di Ottalm.*, xxiv., 7, p. 307.

616. v. HIPPEL. On the presence of peculiar hematogenous formations giving an amyloid reaction, in corneal scars. *Graefe's Archiv*, xli., 3, p. 13.

617. WESTHOFF. A peculiar opacity of the cornea. *Med. Weekblad*, vol. ii., p. 522.

618. MELLINGER. On the question of the injurious effect of cocaine on the healing of corneal wounds. *Arch. f. Augenh.*, vol. xxxii., p. 76.

619. TURNER, W. A. The results of section of the trigeminal nerve, with reference to the so-called trophic influence of the nerve on the cornea. *Brit. Med. Journ.*, No. 95, p. 1279.

620. COLLINS, E. T. Discoloration of the cornea with blood pigment. *Trans. Ophth. Soc. Un. K.*, vol. xv., p. 69.

621. GRIFFITH. Three specimens of blood-staining of the cornea. *Ibid.*, p. 86.

622. DONALDSON, E. Alveolar sarcoma of the cornea. *Ibid.*, p. 90.

623. HARTRIDGE. Tuberculous keratitis. *Ibid.*, p. 87.

UHTHOFF (610) examined fifty cases of purulent keratitis, thirty-five of typical corneal ulcer, ten of hypopyon keratitis not of serpiginous character, three of keratomalacia, and two of panophthalmitis following a corneal affection. In twenty-six cases only pneumococci were found, and in seven the pneumococcus associated with other microbes. In thirteen no pneumococci were found, but other microbes were present. Since in thirty-five cases of serpiginous ulcer, pneumococci were found twenty-nine times, Uhthoff believes that he was justified in assuming this to be the cause of the disease.

In cases of hypopyon keratitis ZINN (612) recommends touching the retrotarsal folds with 1-2 % silver solution, which checks the progress of the disease.

CZERMAK (613) also recommends this treatment, but believes that in many cases it will not replace surgical procedures.

BAQUIS (615) describes in detail an amyloid degeneration of the cornea which he found in an eye blind from irido-cyclitis, with an extensive leucoma adherens. This is the second case of the sort reported, the first having been described by Beselin, these ARCHIVES, vol. xvi., p. 130. DANTONE.

v. HIPPEL (616) like Beselin found in one case of leucoma adherens and in two cases of ectatic scar, peculiar deposits of various sizes, some of which gave the amyloid reaction with iodine. v. Hippel believes that the masses are composed of transformed red blood corpuscles.

WESTHOFF (617) saw in a woman of sixty-one, an opacity of the cornea downward and inward, symmetrical in the two eyes.

The opacities were about 4 *mm* in diameter and about 2 *mm* distant from the limbus. The eyes were otherwise normal and there were no signs of inflammation. The opacities had formed within a year and were gradually increasing. Her father and her only brother had had similar opacities which were not identical with the ribbon-shaped keratitis of von Graefe. WESTHOFF.

TURNER (619) in conjunction with Dr. Ferrier made experiments on section of the fifth nerve. The series consisted of four experiments involving destruction of the tubercle of Rolando, two of section of the restiform body (ascending trigeminal root), four of section of the nerve between the pons surface and the Gasserian ganglion, eight of the ophthalmic branch alone, and two of the "descending" or trophic root of Merkel. Of eighteen experiments, in which corneal anæsthesia was marked, two only showed destructive changes of the cornea and panophthalmitis and in both there was evidence of septic irritation. In many of the cases there was a slight corneal opacity which did not tend to progress due to drying of the surface. Two cases showed that healthy repair may go on in the cornea, whether the nerve be divided behind the Gasserian ganglion or in front of it. In no case was there any evidence of "trophic" influence. Destructive changes are due to inflammatory irritation of the nerve. In ten recorded cases in which the Gasserian ganglion had been removed in man, no destructive changes occurred except as an accident in one. WERNER.

COLLINS (620) adds nine new cases to those already recorded, making seventeen in all. A study of these has enabled him to write a fairly complete account of the condition. The discoloration occupies the whole cornea with the exception of a narrow ring at the periphery. The color varies from greenish-black to reddish-brown. In all cases there was blood clot in the anterior chamber. The bleeding was spontaneous in some cases, with detached retina, and in others due to injuries. T + in nine cases. The discoloration was seen in one case eight days after the hemorrhage. In one case the cornea took more than a year to clear.

1. *Nature of the pigment:* Microscopical, chemical, and spectroscopical examination shows that the pigmentation is due to hæmatoidin plus, in some cases, hæmosiderin. 2. The blood probably enters the cornea from the anterior chamber by diffusion through Descemet's membrane in the soluble form of hæmoglobin. 3. The clear peripheral ring is due to the fact that absorption takes

place from the periphery, and that when the whole cornea is discolored the real nature of the case is not recognized.

WERNER.

The growth was gelatinous-looking, gray and smooth, and extended over sclerotic. [It is not stated whether it adhered to sclerotic or not.—L. W.] Patient æt. twenty-one, female.

WERNER.

HARTRIDGE'S (623) patient is a child æt. fifteen. Exhibited round creamy-pink spots on the back of the cornea, with exudations in the iridic angle also of a pink color. Bacilli could not be found in a small portion which was removed, nor in the globe itself after removal, although iris, cornea, and ciliary body showed typical tubercular deposits with epithelioid cells and giant cells.

WERNER.

624. SCHIRMER. On the pathological anatomy of scleritis and episcleritis. *Graefe's Archiv*, xli., 3, p. 30. (Microscopic description of two typical cases.)

625. FRANKE. On the histological processes in the healing of perforating wounds of the sclera. *Ibid.*, xli., 3, p. 30.

626. VAN DUYSE and BRIBOSIA. Epibulbar fibroma. *Arch. d'opht.*, xv., 11, p. 657.

627. FUCHS. Episcleritis periodica fugax. *Brit. Med. Journ.*, Oct., 1895, p. 951.

In a laborer of twenty-eight, VAN DUYSE and BRIBOSIA (626) observed an epibulbar fibroma as large as a chestnut springing from the upper portion of the cornea and sclera. Three months after removal there had been no recurrence. The authors believe that the new growth had developed probably from a congenital dermoid of the sclero-corneal margin since there was a coloboma of the lid as well as corectopia. v. MITTELSTÄDT.

FUCHS (627) related four cases of this disease, which consists in localized inflammation of the conjunctiva bulbi, but more especially of the episcleral tissue ; there is no secretion, and it differs from episcleritis in the absence of nodes, and rapid disappearance without leaving any traces. There is sometimes pain on movement or on accommodation, and transient spasmodic myosis or myopia. Lachrymation and photophobia are frequent. The disease appears at regular intervals of weeks or months, each attack lasting only a few days. Treatment is powerless. Quinine and sodæ salicylate are somewhat effective. Gout, rheumatism, and malaria are present in some of the cases, but in the majority

no etiology could be found. Hutchinson describes this disease as "hot eye" in the Bowman lecture of 1884, and cases have been recorded also by Nettleship. Emrys Jones stated that he had obtained a good result, in one obstinate case, by peritomy.

WERNER.

628. VAN DUYSE. A case of filaria in the anterior chamber of a healthy eye. *Arch. d'opht.*, xv., 11, p. 701.

VAN DUYSE (628) describes a filaria observed by Coppez and Lacompte in the anterior chamber of a Congo negro, and gives some account of the natural history of the parasite which is a filaria loa endemic on the West coast of Africa, and not to be confounded with the fil. medinensis, which is not found there. The presence of numerous filaria embryos in the blood and the filaria in the anterior chamber permit us to conclude that there are two forms of development of the parasite, and that there is also a connection between the loa and the filaria sanguinis.

V. MITTELSTÄDT.

## Sections XII.–XXI. Reviewed by DR. P. SILEX.

### XII.—IRIS.

629. SNELLEN, H., Jr. The etiology of Descemetitis. *Med. Weekblad*, ii., 1895.

630. FOUCHARD. Four cases of grave ocular affection following constitutional syphilis transmitted by sucklings to their nurses, observed in the nurses or their husbands. *Clin. opht.*, April, 1895.

631. OSTWALT. A notable case of gumma of the ciliary body. *Report of the 24th Meeting of the German Ophth. Society*, 1895.

632. GINSBERG. On idiopathic serous cysts of the iris. *Centralbl. f. prakt. Augenheilk.*, 1895, 332.

633. ROBERTSON. Carcinoma involving iris and ciliary body. *Ophth. Rev.*, xiv., p. 374.

634. SILCOCK. Tuberculosis of the iris and ciliary body. *Trans. Ophth. Soc. Un. King.*, xv., p. 102.

635. BRAILEY. On the iritis of the late stages of syphilis. *Ibid.*, p. 93.

In the *Ophthalmic Hospital Reports* of Oct., 1895, Ridley criti-

cises the view of Snellen that the bacteria found in the deposits on Descemet's membrane are the cause of the disease; the bacteria come with the nutrient fluid from the ciliary body and indicate cyclitis. SNELLEN (629), indeed, has never claimed that in some cases of Descemetitis the exudation was not a product of a deeper inflammation, but in the cases he described no inflammation of the deeper parts could be found. WESTHOFF.

FOUCHARD (630) describes the following four cases of syphilitic ocular affection: 1. Double ophthalmoplegia in a nurse, infected from a bottle-fed infant. 2. Irido-choroiditis of the husband of a nurse who was infected from an infant at the breast. 3. Unilateral optic neuritis in the husband of a nurse infected from a bottle-fed infant; and 4. Iritis in a boy whose mother had the care of a bottle-fed infant. SULZER.

GINSBERG (632) reports a cyst of the iris in a boy of five, which was present at birth and later grew rapidly, there having been no signs of previous injury. The cyst was lined with a single layer of endothelium resting immediately upon the iris stroma. He regards his cyst as a lymph sacculation (Schmidt-Rimpler) leading to a retention cyst.

ROBERTSON'S (633) patient, a woman aged seventy-five, presented a small yellowish pear-shaped body on the iris reaching from ciliary to pupillary border. T +. Optic disc pale cupped. After removal of eye, lens was found to be grooved at lower and inner quadrant. The growth was composed of lobules of epithelial cells in a fibrous stroma, the cells being closely packed in the centre of the lobules, showing at times colloid degeneration. It originated immediately in front of the pigment epithelium, and infiltrated the ciliary region. The growth was apparently primary.

WERNER.

SILCOCK'S (634) patient, a girl aged fourteen, had phthisis, and a tubercular family history. Right eye, vascular mass on iris, large spots of keratitis punctata. After six months' change of air, the general condition and eye improved immensely.

WERNER.

BRAILEY (635) records cases of serous irido-cyclitis occurring on the average thirteen years after primary syphilis, and of iritis, also usually serous, due to inherited disease; about the twenty-first year after birth, it may be followed or preceded by interstitial keratitis. Hutchinson's teeth are rare in these cases.

WERNER.

## XIII.—CHOROID.

636. MORAX. On a case of suppurative choroiditis terminating in recovery. *Ann. d'ocul.*, cxlv., p. 241.

637. EWETZKI. On the dissemination of sarcoma of the uveal tract. *Wjest. ophth.*, 1895, No. 6.

638. CARPENTER, JOHN T. Extensive colloid changes in the choroid with reports of cases. *Journ. Amer. Med. Assoc.*, Nov. 2, 1895.

MORAX (636) criticises the conclusion of Zimmerman, who regarded a purulent irido-cyclitis following a gonorrhœal rheumatism as of gonorrhœal origin and thought its cure due to subconjunctival injections of sublimate. He records several clinical histories showing that the cyclitis following gonorrhœa and gonorrhœal rheumatism has a characteristic and typical course and the recovery from it is independent of treatment. The anatomical classification must be replaced by the etiological in order to avoid the danger of erroneous conclusions. SULZER.

The careful study of two cases led EWETZKI (637) to the conclusion that in sarcoma of the uveal tract an active dissemination may occur. One case was a flat sarcoma of the posterior layers of the iris, which had spread into the ciliary body and choroid as a flat sarcoma. In the iris it had the character of a pigmented round-celled sarcoma, but in the ciliary body it was spindle-celled. The second case was a diffuse flat sarcoma or round-celled alveolar myxosarcoma. HIRSCHMANN.

In his comments upon the six cases of colloid changes in the choroid which CARPENTER (638) reports in his paper, he calls attention to the necessity of a careful examination, under a weak illumination, in making a differential diagnosis between this condition and tubercle and disseminate choroiditis in particular. He considers these bodies similar in structure and origin to the colloid mass of the nerve-head. These masses at the macula seldom are associated with any defect in vision. The disease is always bilateral. He has met the small colloid masses most frequently in the old and the large masses he has found invariably in the young. BURNETT.

## XIV.—GLAUCOMA.

639. BENTZEN. Experimental glaucoma produced in rabbits by irritating the angle of the anterior chamber. Copenhagen, 1895.

640. FORTUNATO. On anterior synechiotomy. *Boll. d'ocul.*, xvii., 21–22, p. 163.

641. ZIRM. A contribution to the anatomy of inflammatory glaucoma. *Graefe's Archiv*, xli., 4, p. 114.

642. GALEZOWSKI. Glaucomatous atrophy of the disc in the syphilitic, simulating tabes, cured by repeated sclerotomies. *Arch. de med. de Paris*, Oct. 22, 1895.

643. NETTLESHIP. A discussion on the question of operating in chronic glaucoma. Introduction. *Brit. Med. Journ.*, Oct., 1895, p. 957.

BENTZEN'S (639) experiments were made under the direction of Prof. Leber in Heidelberg, and had for their purpose the production of increased intra-ocular tension. Various plans were tried, but the successful one consisted in scratching the tissues at the sclero-corneal junction and tearing the membrane of Descemet with needles passed through perforations previously made with a Graefe knife. With the growing together of the chamber angle increased tension with the usual consequences invariably followed.

SCHIÖTZ.

FORTUNATO (640) reports three cases of acute glaucoma following leucoma adherens, in which after cutting the adhesions all symptoms of irritation disappeared, and the tension became normal. DANTONE.

ZIRM (641) examined an eye enucleated thirty-four days after an outbreak of acute glaucoma. In the anterior portion of the uveal tract were signs of a previous iritis with which the patient had suffered, and in the middle portion of the choroid and about the emissary veins a beginning cellular infiltration leading to stenosis with venous hyperæmia and œdema. This hyperæmia he believes causes the pushing forward of the periphery of the iris, leading to blocking of the angle of the anterior chamber.

NETTLESHIP (643) thinks it undesirable to distinguish between chronic glaucoma, and atrophy with cupping which is unaccompanied by true color blindness or any indication of nervous disease. He has had very few cases of contracted fields made worse by iridectomy, and recommends early operation, first on the better eye if both be affected, even in the prodromal stage. Sclerotomy he employs in case of failure of the iridectomy. Scleral puncture may render the iridectomy easier to perform. Critchett, P. Smith, and others thought a cystoid cicatrix desirable, and Walker endeavored to produce it by tucking a flap of conjunctiva into

the wound. Treacher Collins found that cystoid cicatrix was due to prolapse of a fold of iris in the wound. Iridectomy was preferred to sclerotomy except by Panas, who tries sclerotomy first where myotics are insufficient. WERNER.

## XV.—SYMPATHETIC OPHTHALMIA.

644. LUCIANI. The cure of ophthalmia migratoria with subconjunctival or intra-tenonic injections of sublimate. *Ann. di Ottalm.*, xxiv., 5, p. 494.

645. LAQUEUR. On the curability of sympathetic iridochoroiditis. *Ann. d'ocul.*, cxiv., p. 369.

646. LEDBETTER. A case of sympathetic ophthalmia after iridectomy. *Annals of Oph. and Otol.*, Oct., 1895.

LUCIANI (644) reports on two cases of sympathetic ophthalmia in which repeated subconjunctival and subcapsular injections of sublimate led to recovery with fairly good vision.

DANTONE.

LAQUEUR (645) reports five cured cases of sympathetic iridocyclitis. In all five the enucleation of the first eye had no effect on the progress of the disease in the other. Enucleation should not be neglected, however, when vision has been abolished. Age seems to have some influence, as all of his five cases were under thirty and three were in children. In all the inflammation began in the retina and optic nerve, the plastic iritis coming on later.

SULZER.

In the case reported by LEDBETTER (646) both eyes were needled for soft cataract in a girl of seventeen. One eye did well, but the other set up an iritis which resulted in adhesions and almost total loss of vision. For this an iridectomy was done, and following this there was sympathetic trouble in the fellow eye, for which an enucleation of the offending eye was made. The acute symptoms subsided, but vision was not improved.

BURNETT.

## XVI.—VITREOUS.

647. SIEGRIST. Hemorrhage between retina and vitreous in the macula region. *Mittheilungen aus Kliniken und medicinischen Instituten der Schweiz*, series iii., part 9.

SIEGRIST (647) describes one of the rare cases which was due to a hemorrhage from a branch of the superior nasal vein while

the patient was blowing a trumpet. The large half-oval blood mass in the macula was transformed into a white lustrous disc with sharp margins. He believes that during the period of resorption a layer of fibrin was deposited behind the hyaloid membrane covering the elements of the blood lying behind it. The absorption was completed in a year and good vision secured.

## XVII.—LENS.

648. DANESI. On the technique of cataract operations in general and of the corneal section in particular. *Bull. d'ocul.*, xvii., 21–22, p. 166.

649. SCHULECK. Cataract extraction with a concave flap and a round pupil. *Hungarian Contributions to Ophth.*, Nos. 1, 2, 3.

650. CECILLO. The operation of cataract and the method of extracting the cortical layers. *Rec. d'opht.*, 1895, p. 526.

651. RINALDI. Ripening of cataract by means of massage directly on the lens. *Ann. di Ottalm.*, xxiv., 5, p. 479.

652. PARISOTTI. Artificial ripening of cataract. *Bull. de Reg. Accad. Med. di Roma*, xxi., fasc. v.

653. SULZER. An historical essay on the extraction of cataract. *Ann. d'ocul.*, cxiv., p. 232.

654. OLIVER. History of a case of successful iridectomy and extraction of lens-capsule and lens-debris, with recovery of vision, in an eye that had been considered useless for more than ten years. *Univ. Med. Mag.*, Nov., 1895.

655. TIFFANY. Ectopia lentis. *Journ. Amer. Med. Assoc.*, Nov. 9, 1895.

656. WEEKS. The operative treatment of immature and some forms of zonular cataract. *Ibid.*, Oct. 19, 1895.

657. COLLINS, E. T. Lamellar cataracts and rickets. *Trans. Ophth. Soc. Unit. Kingd.*, xv., p. 104.

658. GUNN, R. M. Peculiar coralliform cataract with crystals (? of cholesterine) in the lens. (Plate iv.) *Ibid.*, p. 119.

659. GUNN. Peculiar variety of lamellar cataract. *Ibid.*

660. JOHNSON, G. L. Case of lamellar cataracts showing symmetrical markings in a boy aged nine (Plate v.). *Ibid.*, p. 120.

661. LONG. Right lenticonus posterior. *Ibid.*, p. 122.

CECILLO (650) recommends, as others have done, removing the cortical masses from the anterior chamber by puncture four or five days after extraction. SULZER.

RINALDI (651) favors the artificial ripening of cataract by trituration of the cortex with an elastic tortoise-shell spatula passed through a corneal incision, no iridectomy being done. DANTONE.

PARISOTTI (652) recommends the same procedure, which he has done successfully in eighteen cases, some of which were in the incipient stage. DANTONE.

The famous report on cataract extraction by Daviel to the Royal Academy of Surgery, on November 16, 1752, was not, as SULZER (653) shows, the first communication by Daviel on this subject, as has been commonly supposed. Nearly a year before, when his operations numbered 115, he had presented the matter to the Academy of Sciences.

From 1745–1752 Daviel's flap included two thirds of the corneal circumference; after this time he usually included only one half of the corneal circumference in his section, making it in the limbus. In certain cases iridectomy was done. His first experiments were scleral extractions. This operation, however, was as quickly dropped by him as by all the other operators, except Graefe, who have periodically tried it, but have soon recognized its disadvantages. The washing out of the anterior chamber was practised as early as the beginning of the eighteenth century. SULZER.

The eye in the case reported by OLIVER (654) was injured by a piece of coal ten years before. The cataract caused by the trauma was partially absorbed, but the capsule with some lens matter remained, and there was a posterior synechia down and out. An iridectomy was made in this portion of the cornea, and the capsule with the adhering mass of lens-debris removed with the loss of a few drops of vitreous. Vision was advanced from light-perception to $\frac{6}{36}$. No reaction followed the operation. BURNETT.

TIFFANY (655) observed ectopia lentis in both eyes in seven children out of nine of the same family. All were up and out or up, except in one eye, which was up and in, and in two which were directly outward. The father of these children, who was dead, was reported to have had tremulous iris, and to have been very short-sighted. BURNETT.

WEEKS' (656) experience has been against the Förster method of maturing cataracts. He extracts as soon as the dimness of vision becomes a serious detriment. The simple extraction is the form usually employed. A statistical list of twenty-five cases is appended to the paper. BURNETT.

COLLINS (657) collected evidence from Australian medical men which showed that rickets and lamellar cataracts were both much rarer than in England. The author, while in Persia, also made inquiries which show that rickets and lamellar cataract are also very rare in that country. WERNER.

662. WESSELON. A typical case of subretinal hemorrhage. *La clin. ophth.*, Feb., 1895.

663. CZERMAK. Demonstration of a case of bilateral glioma of the retina. *Prager med. Wochenschr.*, No. 49, p. 548.

664. GROCZ. Toxic amaurosis. *Hungarian Contributions to Ophth.*, 1895, No. 1.

665. HAMLISCH. A case of quinine amblyopia. *Wien. klin. Rundschau*, 1895, No. 31.

666. TKATSCHENKO. On the etiology of hemeralopia in soldiers. *Wojenno med. Journ.*, Dec., 1895.

667. BÜRSTENBINDER. Anatomical examination of a case of retinitis pigmentosa. *Graefe's Archiv*, xli., 4, p. 1175.

668. KRIENES. On adaptation and disturbances of adaptation. *Arch. f. Augenheilk.*, xli. (supplementary number).

669. NUEL. Changes in the macula lutea (first communication). The star-figure in retinitis albuminurica. *Arch. d'opht.*, xv., No. 10.

670. JANNICKE. On the treatment of detachment of the retina. *Inaug. Dissert.*, Berlin, 1895.

671. JATZOW. The treatment of detachment of the retina by cutting into the retina and vitreous. *Sixty-seventh Meeting of German Naturalists and Physicians*, Lübeck, 1895.

672. LODATO. Subconjunctival injections of chloride of sodium in detachment of the retina. *Arch. di Ottalm.*, iii., 5–6, p. 148.

673. GROENOUW. The best chart for the visual field. *Arch. f. Augenheilk.*, xxxi. (supplementary number).

674. LANNOIS. Hemianopsia of hysterical origin in a patient who had been trephined and who had epileptiform crises. *Congrès français*, cxiv., p. 303.

675. WILBRAND. The extent of restoration of the visual field and the explanation of concentric contraction. *Sixty-seventh Meeting of German Naturalists and Physicians*, Lübeck, 1895.

676. WRAY. Detachment of retina with + tension. *Trans. Ophth. Soc. Un. Kingd.*, XV., p. 125.

677. GRADLE. The neurological aspect of asthenopia. *Med. Record*, Dec. 7, 1895.

678. GRADLE. Hysterical insufficiency of convergence. *Journ. Amer. Med. Assoc.*, Nov. 9, 1895.

679. BELT, E. O. Prognostic significance of albuminuric retinitis. *Ibid.*, Nov. 2, 1895.

680. FRIEDENWALD, H. Hemorrhage into the retina and vitreous in young persons associated with evident disease of the retinal veins. *Ibid.*, Oct. 20, 1895.

The case of bilateral glioma shown by CZERMAK (663) was interesting because a transient phthisis developed in the right eye, while the left presented the ordinary clinical picture of glioma. At that time the eye that had been phthisical was again enlarged and showed numerous epibulbar nodules.

HERRNHEISER.

HAMLISCH (665) saw total blindness in a child of four after a single dose of 2.5 grs. of quinine. The ophthalmoscopic appearance was normal and vision returned in a few hours.

TKÁTSCHENKO (666) observed an epidemic of hemeralopia in three regiments, affecting from 35–50 per cent. of the men, after severe exercise in firing in the summer time. They all recovered without other treatment than a rest of one or two days.

HIRSCHMANN.

BÜRSTENBINDER (667), in an eye with retinitis pigmentosa, found a partial atrophy and a partial hypertrophy of the pigment epithelium. The rods and cones and the ganglion cells had quite disappeared. Some remains of the outer nuclear layer were found, while the inner nuclear layer and nerve-fibre layer were relatively well preserved. There was everywhere a marked proliferation of pigment which came from the epithelial layer. The choroid, as in Wagenmann's case, was affected at points corresponding to the parts of the retina affected. The vessel walls were thickened, the chorio-capillaris wanting, and there was a diffuse infiltration with leucocytes. The patient was aged sixty-one, V = $\frac{5}{18}$; disturbance of vision for five years; outer periphery

of fundus normal. The reviewer does not consider such cases typical retinitis pigmentosa.

According to KRIENES (668) adaptation consists of two factors: (*a*) the production of visual substance by the choroidal glands to supply the visual substance consumed by the incident light; and (*b*) the action of the retinal pigment, when the eye is illuminated, preventing the excessive decomposition of the visual red when the illumination is increased. If either of these factors is interfered with a disturbance of adaptation arises in which the patient is dazzled by degrees of illumination that are well borne by the normal eye, a condition that disposes to hemeralopia. Acute hemeralopia arises (*a*) when the production of visual substance is interfered with, and (*b*) when there is a small amount of retinal pigment. The symptoms consist in a limitation of the extent of adaptation, and an incomplete adaptation within this extent. The central acuteness of vision is reduced even in daylight. The threshold irritation by Förster's photometer is raised. In marked cases there is a central scotoma with reduced illumination. There is a contraction of the field for white and also for colors, the fields being reversed so that that for blue is smaller than that for red. As accompanying symptoms there may be spasm of accommodation, conjunctivitis, and necrosis of the epithelium. In four of the seven cases reported there was circumpapillary œdema of the retina. A further symptom of fatigue is erythropsia

In an eye with the typical star-figure of retinitis albuminurica in the macula, NUEL (669) found numerous lacunæ in the outer reticular layer filled with homogeneous albuminoid or fibrinous matter with many white blood corpuscles. The other layers were normal except for a prolongation of the outer elements of the rods and cones. Between the choroid and retina was the same homogeneous exudation and in its entire extent the retina was somewhat elevated by the shrinking of the exudation. A second case showed similar changes, hypertrophy of the nerve-fibre layer being wanting in both. v. MITTELSTÄDT.

JANNICKE (670) cites 11 cases of detachment of the retina treated by Deutschmann according to his new method of cutting through the retina and vitreous, and compares them with a number of cases treated by means of the pressure bandage, etc. In the latter cases the retina was seldom reattached, but as regards the acuteness of vision the results are equally good.

LODATO (672) reports 4 cases of detachment of the retina

treated with subconjunctival injections of sodium chloride. In two old cases no result was obtained, but two recent cases were much improved by 4 or 5 injections of 2-3 per cent. solution.

DANTONE.

GROENOUW (673) prefers Förster's chart of the visual field to Hirschberg's, since the former represents the spherical surface less distorted; and also because the numbering of the meridians begins above and goes to the right in the right eye, and to the left in the left eye, thus keeping the symmetry of the two retinas.

LANNOIS (674) observed the following case. A patient who had received a fracture of the skull on the right side, for which he had been trephined, had attacks of partial epilepsy, after which there was found left homonymous hemianopsia with complete left anæsthesia and loss of muscular feeling. Later the anæsthesia was incomplete, and after the use of electricity it suddenly disappeared with the hemianopsia which gave place to a concentric contraction. A short time after symptoms of hemianæsthesia and hemianopsia returned. SULZER.

WILBRAND (675) making his tests in an absolutely dark room, and marking the test object and the point of fixation with luminous colors, showed that an eye which had been exposed to light gradually lost the concentric contraction of the field which it has when brought into the dark, and he attributes this restoration to a regeneration of the visual substance. Eyes with concentric contraction due to nervous disturbances also have in the dark a tendency toward restoration. With injury to the rods or their nutriment (from inflammation or lack of blood supply) and with disturbance in centrifugal conduction (hysteria), the reproduction of visual substance is delayed and a narrowing of the visual field results.

In WRAY'S (676) case there was a detachment down and involving a third of the fundus. Vitreous hazy. T +. A year later condition unaltered. WERNER.

It is GRADLE'S (677) opinion that all cases of what he calls exaggerated asthenopia—that is asthenopia out of proportion to the optical defect—are referable to some abnormal condition, and most frequently an inherited instability of the nervous system. His practical suggestion is that in all cases of this kind search be made for the neurosis, which may be reflex, and to treat this rather than the optical difficulty. It may, however, be wise at times to prescribe glasses for temporary use. BURNETT.

GRADLE (678) is of opinion that many cases of insufficiency of convergence not necessarily associated with exophoria for distance are examples of hysteria, and gives the histories of two cases, among others that he has seen, in illustration of his views.
BURNETT.

BELT (679) has collected the opinions of a number of American ophthalmologists as regards the duration of life after the first observation of albuminuric retinitis. Of a total number of 419 cases obtained from various published statistics in connection with his own of 100 cases, 72 per cent. died within a year, 90 per cent. died within 2 years, and 9 per cent. lived more than 2 years. BURNETT.

FRIEDENWALD (680) reports two cases in full detail, with drawings of hemorrhage into the retina and vitreous such as is commonly seen in young persons. The ages of the patients were fifteen and twenty-two years respectively. These hemorrhages were at first peripheral and multiple, and in one case there were several varices of the retinal veins. From the behavior of these cases he is inclined to think that there is disease of the muscular walls in all such cases, probably a sclerosed condition. In one case the hemorrhage was sub-hyaloid and travelled quite a distance around the macula, the centre of which, however, was not detached. BURNETT.

## XIX.—OPTIC NERVE.

681. CASPAR. On the congenital anomalies of the optic disc. *Arch. f. Augenheilk.*, xxxiii., p. 13.

682. JANASKIEWICZ. The cause, as regards time, of syphilitic disease of the optic nerves in 150 cases. *Centralbl. f. prakt. Augenheilk.*, 1895, p. 358.

683. BAER. On paralyses of the optic nerve after contusions of the skull, in their forensic relations. *Arch. f. Augenheilk.*, xxxi. (supplementary number).

684. LEBER. On the connection between inflammation of the optic nerves and intracranial diseases, particularly tumors. *Naturhistorisch-medicin Verein zu Heidelberg*, July 14, 1895.

685. OGILVIE, GEORGE. Nasal coloboma of the optic nerve; gray atrophy of the disc with peculiar fields; temporal hemianopsia in the right eye; inferior hemianopsia in the left eye; nervous symptoms of obscure origin. *Trans. Ophth. Soc. Un. Kingd.*, xv., p. 127.

686. ALT, O. Neuritis optica descendens consequent upon nasal treatment. *Amer. Journ. of Ophth*, Sept., 1895.

687. WOOD, C. A. A case of temporary amblyopia from chocolate. *Med. Rec.*, Dec. 4, 1895.

CASPAR (681) describes congenital membranes on the optic disc, and masses which are deposited in the disc itself. Many of the connective tissue masses are perhaps due to an imperfect clearing of fœtal vitreous tissue or of the hyaloid artery. No microscopic descriptions are given.

JANASKIEWICZ (682) divides the affections of the optic nerves following acquired syphilis into two groups: 1st, the non-inflammatory, due to various degenerative processes in the optic nerves; and 2d, the inflammatory, which frequently pass over into atrophy. Of 150 cases 71 per cent. were of the first category, and 29 per cent. of the second. In the first category 30 per cent. were of genuine, and 17 per cent. of spinal atrophy. In the second category the inflammation was in the acute stage in 17 per cent., and in that of inflammatory atrophy in 11 per cent. In the genuine atrophies the disturbance of vision appeared most frequently five to ten years after the infection. In 10 cases amaurosis came on in the course of treatment. The shortest course was six months, the longest five years. Tabic atrophy appeared most from five to twenty years after infection. Acute specific neuritis was mostly from one to five years after infection. Neuritic atrophy was mostly late.

BAER (683) believes that there are four types of the effect of contusions on the optic nerve: 1. Transverse fracture of the optic canal, with displacement of the fragments and total rupture of the nerve, followed by immediate amaurosis and descending atrophy. 2. Fissure of the optic canal, without change of form, followed by hemorrhage, causing compression particularly of the peripheric layers, revealed by general diminution of acuteness of vision, with concentric contraction of the visual field. There may be restitutio ad integrum. 3. Mixed forms between these two extremes, in which only repeated taking of the visual field can enable one to decide as to the nature of the injury and its further course. 4. The cases with lasting complications of particular forensic interest. These types are illustrated by 6 cases. The author concludes that the proof of a connection between amaurosis and fracture of the optic canal is not always possible, and there may previously have been atrophy or amblyopia. A spon-

taneous atrophy, which is rarely unilateral, could only be ruled out if the field of the other eye was absolutely normal, and when immediately after the injury there is complete amaurosis, with a normal disc, which gradually becomes pale.

According to LEBER (684), these affections can only be explained on the supposition that the increased amount of fluid in the intervaginal space due to the lessened space in the cranial cavity, acts phlogogenically. Microscopically, inflammatory changes are found before they can be discovered with the ophthalmoscope.

OGILVIE'S (685) patient, a man, aged fifty-six, suffered from epileptic fits. Three out of seven of his children also had epileptic fits. He was a cigar sorter, but hardly ever smoked more than nine cigars and one ounce of tobacco in a week. His sight failed so that in four months he was obliged to stop work. Some atrophy of both discs, with nasal crescents, evidence of previous neuritis. Patellar and wrist jerks exaggerated. No alcoholism, albuminuria, or syphilis. Very well defined inferior hemianopia in left eye, and left lateral hemianopia in right. Dr. Taylor looked upon the fields as being the result of atrophy consecutive to neuritis, and hence caused by peripheral disease. WERNER.

In ALT'S (686) case, a man of thirty-eight, with a history of syphilis some years back, was under treatment for nasal obstruction in which the galvano-cautery was used. After a few applications the sight in the left eye (the side on which the cauterization was made) began to fail and Alt found, a few days after, complete blindness associated with a neuro-retinitis. The application to the nose was stopped, and the condition began at once to improve, and finally vision was restored to $\frac{20}{30}$, and the V.FF., which had been contracted, extended, but not to the normal extent. The disc was whitish. BURNETT.

In the case (687) reported by WOOD, the patient, a man of fifty-four, had periodic attacks of migraine associated with temporary blindness and vertigo lasting for from three-fourths to one hour. It was finally discovered that this was brought about by the injection of chocolate in some form, and since he has abandoned its use he has not had an attack of the former malady. BURNETT.

## XX.—INJURIES, FOREIGN BODIES (PARASITES).

688. PERGENS. Two interesting cases of trauma. *Zehender's klin. Monstabl.*, vol. xxxiii., p. 449. (First case, cornea and iris

absent. Lens in position and transparent at date of last examination, four and a half years after injury.)

689. CATTANEO. Traumatic coloboma of the lid involving the course of the lachrymal canal. *Arch. di Ottalm.*, vol. iii., 5–6, p. 156.

690. SCHMIDT-RIMPLER. The employment of strong electro-magnets for extracting splinters of iron from the eye. *Berl. klin. Wochenschr.*, 1895, p. 86.

691. ASMUS. On further experiences with the sideroscope. *Arch. f. Augenheilk.*, vol. xxxi. (supplementary number).

692. GELPKE. An interesting magnet operation. *Centralbl. f. prakt. Augenheilk.*, 1895, p. 337.

693. ADLER. Metallic foreign body in the disc. *Prager med. Wochenschr.*, 1895, No. 50.

694. BAQUIS. On living parasitic larvæ on the human conjunctiva. Clinical and zoölogical contribution. *Annal. di Ottalm.*, vol. xxiv., 7, p. 329.

695. ROBERTSON, ARGYLL. A case of filaria loa in which the parasite was removed from under the conjunctiva. *Trans. Ophth. Soc. Un. K.*, vol. xv., p. 187.

On the ground of four cases observed clinically and several experiments on dogs, CATTANEO (689) concludes that in injuries of the lids the lachrymal canals are generally closed in the process of cicatrization, but epiphora does not always result, since the canaliculus of the uninjured lid is usually able to carry off the tears. DANTONE.

SCHMIDT–RIMPLER (690) in seven cases used a large Ruhmkorff electro-magnet to extract foreign bodies from the eye, as recommended by Haab. The result was good in three. It is important that the eyeball should be fixed, and in cases in which the bit of iron has perforated the cornea but not injured the lens the magnet should be placed at the periphery of the iris and not over the corneal wounds. The strong magnet is particularly indicated in cases in which the foreign body is not seen. When it is seen the Hirschberg magnet is perhaps better.

GELPKE (692) extracted with a magnet through a meridional section an iron splinter that had remained nine months in the vitreous. The vision which was only quantitative perception of light, rose to 0.2.

ADLER (693) reports an interesting case of foreign body. A

blacksmith of twenty-one received a blow on the right eye that produced unconsciousness and permanent blindness of that eye. Two years later V = o, disc not sharply outlined and only recognizable from the presence of the vessels, being covered with tumor-like masses of connective tissue of grayish-yellow color with deposits of cholesterin crystals. In this new tissue was a grayish mass that seemed to be a metallic foreign body, and a scar was found in the cornea, and there was a corresponding partial opacity in the lens. The cause of the sudden loss of sight was probably a rupture of the central artery at the time of injury.

HERRNHEISER.

BAQUIS (694) found as the cause of a sudden severe conjunctivitis in a young man, more than forty living larvæ 1½ *mm* long in the conjunctival sac. These were killed with cocaine and bichloride. They belonged to the gnats of the family *Tachinaria*. Cartuferi has also seen similar maggots in the conjunctival sac.

DANTONE.

ARGYLL ROBERTSON'S (695) patient was a lady who had lived at Old Calabar on the West Coast of Africa. Owing to debility from intermittent fever and dysentery she was obliged to return home. Shortly after, she observed wriggling under the conjunctiva and sometimes under the skin of the eyelids, causing an irritating tickling sensation. It wandered from one eye to the other, and disappeared at times for as long as two months. It especially came to the surface in a warm atmosphere. The author succeeded in removing the worm, which was like a piece of fishing gut, 25 *mm* long and barely 0.5 *mm* in breadth. It was examined and described in detail by Dr. Patrick Manson, who found that it was a male. Notes of other cases, some unrecorded, are then given. In one case the worm was seen to pass from one eye to the other, under the skin over the bridge of the nose. Dr. Manson had found in the blood of fifty per cent. of the negroes at Calabar the embryos of filaria perstans, and in one case also a filaria which could only be found during the day, and which he calls f. diurna. These, he thinks, are practically identical with the embryos of filaria loa, and the patient had one under the conjunctiva. The intermediate host is probably a blood-sucking insect which is very common in Calabar, and is diurnal in its habits. The filaria loa will not live in the West Indies, owing probably either to the habits of the people or the absence of the proper intermediate host. This is the only human filaria

whose skin is covered with protuberances. No filaria could be found in the blood of Dr. Argyll Robertson's patient.

WERNER.

## XXI.—OCULAR DISTURBANCES IN GENERAL AFFECTIONS.

696. ALEXANDER. On vascular changes in syphilitic eye diseases. *Berl. Klinik*, 90, 1896.

697. MANZ. On some tuberculous inflammations of the eye. *Münch. med. Wochenschr.*, Nos. 45–46, 1896.

698. DENIG. On the frequency of local tuberculosis of the eye, and the relation of tuberculosis of the eye to the tuberculosis of the other organs, with remarks on diagnosis and prognosis. *Arch. f. Augenheilk.*, xxxi., p. 359.

699. SOKOLOW. On ocular affections dependent upon ascarides. *Waj. Med. Jour.*, Dec., 1895.

700. HORI. On the anatomy of an ophthalmia hepetica. *Arch. f. Augenheilk.*, xxxi., 4, p. 393.

701. WEISS and GÖRLITZ. A case of unilateral blindness and diabetes after severe trauma. *Ibid.*, p. 407.

702. LAGRANGE. Leproma of the bulbar conjunctiva. *Ann. d'ocul.*, cxiv., p. 303.

703. BOYER. The relative importance of labyrinthine and ocular affections in the etiology of vertigo. *Ibid.*, p. 348.

704. GASPARRINI. Bilateral metastatic ophthalmia from typhus. *Ann. di Ottalm.*, xxiv., 3, p. 343.

705. LAVAGNA. Panophthalmitis following influenza. *Giorn. d R. Acad. di Torino.* 9–10, 1895.

706. AXENFELD. Eye diseases of pregnancy. (1) Retinitis albuminurica gravidarum. (2) Eye changes from puerperal septico-pyæmia. (3) Transitory disturbances of vision during the period of lactation. *Monatschrift f. Geburtshilfe u. Gynäkologie*, p. 516, 1895.

707. WILBRAND. On the extent of restoration of the visual field and the nature of concentric contraction. *Allg. med. Centralzeitung*, Nos. 96–98, 1895.

708. WILBRAND. The extent of restoration of the visual field under normal and pathological conditions. With 8 plates. Bergmann, Wiesbaden, 1895.

709. STRAUB. Vasomotor neurosis of the eye caused by irritation of the nasal mucosa. *Tydschrift voor Geneeskunde*, i., p. 178, 1896.

710. HERRNHEISER. On the ophthalmoscopic condition found with polio-encephalitis hemorrhagica superior. *Wiener med. Presse*, No. 44, 1895.

711. FREUND. Softening of the occipital medulla. *Deutsche med. Wochenschr.*, No. 38, 1895.

712. RAKOWICZ. On the question of nasal hemianopsia. *Zehender's klin. Monatsbl.*, xxxiii., p. 431.

713. ANTON. On disturbances of the power of orientation. *Wiener med. Presse*, p. 1836, 1895.

714. ANGELUCCI. The effects of trephining the skull on the œdema of the disc caused by brain tumor, in three patients. *Arch. di Ottalm.*, iii., 1, 2, p. 34.

715. BENSON, A. H. Case of acromegaly with ocular complications. *Brit. Med. Journ.*, p. 949, 1895.

ALEXANDER (696) gives first a brief *résumé* of our knowledge of syphilitic vascular disease in general, and of that of the eye in particular. Michel was the first to take into account the vascular changes in syphilitic iritis. He found an endarteritis of the small vessels, and in the formation of nodules a proliferation of epithelioid elements due to circulatory disturbances. The vessels of the choroid are similarly diseased and glaucoma results, which is not cured by iridectomy, but by mercury. The retinal arteries become diseased, particularly in their terminal branches, in the same way that the cerebral vessels are affected, the walls becoming thickened with proliferation of nuclei, the intima hypertrophied, and the capillaries varicose. Later, the adventitia of the larger vessels becomes diseased with gummous formations in the walls and narrowing of the lumen. Ophthalmoscopically are then seen white branching cords. The gray gummous formations on the vessels are not seen in many cases. Syphilitic disease of the optic nerve is usually consecutive to gummous processes in the meninges and brain. There is concentric contraction of the field, never a central defect.

MANZ (697) believes that tuberculous affections of the eye are more frequent than is commonly supposed. He describes a case of keratitis and iritis of tuberculous nature improved by treatment. We must not consider every case of parenchymatous keratitis or of iritis with nodules as necessarily syphilitic.

DENIG (698) draws the following conclusions: 1. There is a local tuberculosis of the eye in the sense of a primary colonization of the infectious material at that point. This is shown by the facts that in many cases tuberculosis was not present elsewhere, that the process remained local, and, indirectly, that in 220 tuberculous individuals only five had ocular affections. 2. A rarer form of local tuberculosis is that which is to be regarded as metastatic coming from some other infected part of the body. The development of such a tuberculosis is favored by exacerbations in the primary focus. 3. Great attention must be paid to the clinical picture, since the pathological picture is not always the stereotyped one—inoculation experiments may fail and bacilli may be wanting. Furthermore, tuberculosis often affects individuals who are not of tuberculous appearance. 4. The prognosis depends then upon the category in which the case belongs; in the first category the prognosis quoad vitam is, on the whole, good. The granulation tumors of the first category may, however, lead to the formation of metastases in the liver. In attenuated tuberculosis (Leber) we have nothing to fear. In the second category the prognosis is usually bad.

SOKOLOW (699) records a case of amblyopia and two of obstinate blepharospasm, which recovered after the passage of a number of ascarides. HIRSCHMANN.

Ophthalmia hepetica is an ocular affection accompanying diseases of the liver or gall ducts. In such a case HORI (700) found microscopically a chronic inflammation of the uvea involving the other coats of the eye and a streptococcus ulcer of the cornea. The marked sclerosis of the ciliary processes indicates that the disease originates in the anterior segment. He considers the corneal affection analogous to the keratomalacia of children, *i. e.*, an expression of disturbances of nutrition.

WEISS and GÖRLITZ (701) report the case of a mason's apprentice who fell from a height on his head, causing blindness in the right eye from hemorrhage into the intervaginal space of the optic nerve, diabetes, and psychical disturbances, so that he was unfit for work. The anatomical changes underlying traumatic diabetes, which does not differ from the idiopathic, are not yet understood. SULZER.

LAGRANGE (702) states that all forms of lepra may attack the eye. The anæsthetic form is localized in the cornea and causes xerosis and lagophthalmus; lepra tuberosa causes swellings at

the limbus which are identical with the swellings elsewhere in the body. Most authors consider lepra of the cornea more frequent than that of the conjunctiva. The author has observed a case, however, in which the intact cornea was surrounded by a row of lepra nodules in the conjunctiva. The iris was the seat of a plastic inflammation; the infection seemed to have passed through the filtration angle into the anterior chamber without affecting the cornea. Bacteriological examination revealed the presence of great quantities of lepra bacilli. Inoculations into the anterior chamber of rabbits were not successful. SULZER.

BOYER (703) believes that a number of cases of vertigo are wrongly attributed to labyrinthine disease. Tinnitus aurium is no proof of the existence of a middle-ear affection. Since Stevens has called attention to the fact that other ocular anomalies than muscular paralyses may cause vertigo, the cases have multiplied in which heterophoria was accountable for vertigo. Boyer seeks to show by a number of cases histories that marked attacks of vertigo may be due to heterophoria, and that definite clinical groups of vertigo correspond to particular forms of heterophoria.

GASPARRINI (704), in a patient with typhoid fever, saw a bilateral purulent keratitis with hypopyon, which apparently began in the choroid; later there developed a retrobulbar abscess and an abscess of the lachrymal sac. In the pus from all these localities a bacillus was found which resembled both the bacillus typhi and the bacillus coli. The author regards the affections in and near the eye as being caused by metastases of microbes and not by typhoid toxins. DANTONE.

LAVAGNA (705) saw a case of irido-choroiditis following influenza, which passed into panophthalmitis. In the secretion the micrococcus tetragonus pyogenes and the staphylococcus pyogenes citreus were found. DANTONE.

In the introduction to his comprehensive and interesting work, WILBRAND (708) states that he has endeavored in it to give a physiological explanation of the nature of concentric contraction or limitation of the visual field from fatigue, and to refer all the clinical signs of purely functional disturbance to certain processes in retinal metabolism.

His method of testing the visual field with luminous colors in a dark room in order to find how the field in normal and pathological conditions is restored to the normal, has revealed the noteworthy fact that in all organic lesion of optical conduction, these

symptoms, which we are accustomed to consider purely functional disturbances, run a parallel course. While the absolute defects are caused by the destruction of the centripetal tracts, the parallel course of the purely functional disturbances can only be dependent upon the simultaneous destruction of the lately discovered centrifugal optic tracts. Centripetal tracts carry the excitation from the retinal cones to the centres of optical perception, the centrifugal tracts on the contrary seem to stand in a conducting relation with the retinal rods; these rods now would seem to be the elements which restore the visual substances consumed by the cones.

Intoxications or changed blood conditions influencing retinal metabolism or restricting influences on the cells of origin of the centrifugal fibres (as in hysteria) cause in the former case a delayed reproduction of the visual substances, while in the latter case the concentric contraction is due to central restricting influences.

The book is composed of five sections treating of Hering's theory of light-sense, simultaneous contrast and irradiation, adaptation and dazzling of the retina, and the extent of restoration of the field in the normal eye.

STRAUB'S (709) patient, a man of thirty-one, had recurrent attacks of pain and redness of the eyes, with lachrymation and photophobia. The refraction was emmetropic. Treatment of a spur on the nasal septum and a hypertrophic nasal mucosa caused a cessation of the attacks. WESTHOFF.

In HERRNHEISER'S (710) patient small circular spots of blood surrounded the disc and striated hemorrhages lay along the veins. He believes that the tendency to hemorrhages in various parts of the body is characteristic of general intoxications such as sepsis, scorbutus, pernicious anæmia, etc., in which category polioencephalitis certainly belongs.

FREUND (711) records the case of a man of fifty-six, who after vomiting became somnolent for two days, after which he almost lost the use of the right arm and leg. No ataxia or disturbance of sensibility, but some slowness of speech. The diagnosis of a cerebral focal lesion was first made when a complete right homonymous hemianopsia was discovered. The left halves of the field gradually became concentrically contracted, while the aphasic symptoms decreased.

The absence of mind blindness, the lack of disturbance of

orientation, and the consciousness of the loss of portions of the field indicate not a cortical but a medullary lesion.

RAKOWICZ (712) speaks against the use of the expression "nasal hemiopia" as a symptom of chiasm disease, for it is always an accidental form of the visual field due to atrophy of the optic nerve. He bases his views upon experiments on animals, in which he finds that in the lateral angles of the chiasm there are not only direct but also crossed fibres. In the middle of the chiasm and in its anterior and posterior angles only crossed fibres are found.

ANTON (713) records the case of a woman with diminution of vision but good pupillary reaction and normal fundus. Later she suddenly became completely blind, but she was unaware of her condition. There was marked loss of spatial orientation, even the distinction between left and right not being clear. At the autopsy symmetrical foci were found of the convex surface of the occipital lobe. The connection of the occipital cortex with other parts of the brain was largely interrupted. The blindness was due to the interruption of the tracts of projection from the occipital lobe.

ANGELUCCI (714), on the ground of previous observations and the reports of others, had the skulls of three patients suffering with choked disc, trephined. He was so pleased with the results that he recommends that the operation be done as soon as the condition of the optic nerve indicates a cerebral affection and loss of vision seem imminent. Syphilis must of course first be excluded. DANTONE.

BENSON'S (715) paper was read at the British Medical Association meeting. The patient was a man æt. thirty-eight, who, after an injury to his leg nine years before, began to grow lazy, sleepy, and big. Was a heavy smoker; had central color scotoma and bitemporal color defects. V = $\frac{6}{60}$. After giving up smoking, and taking KI, V became $\frac{6}{6}$ and remained so for two years. He then took to smoking again and V reduced to $\frac{6}{60}$; he presented the characteristic appearance of acromegaly, with irregular bitemporal hemianopsia. Thyroid extract tabloids were ordered, but next day vision reduced to p. l. After use of fresh thyroid extract V improved to $\frac{6}{6}$. Field improved. Other cases were described by Drs. Meyer, Little, Panas, Hill, Griffith, and Snell.

WERNER.

# REPORT OF THE PROCEEDINGS OF THE MEETING OF THE AMERICAN OPHTHALMOLOGICAL SOCIETY, HELD AT NEW LONDON, CONN., JULY 15 AND 16, 1896.

By Dr. H. V. REIK, of Baltimore, Md.

President: Dr. Geo. C. Harlan, of Philadelphia.

Memorials were read on the deaths of Drs. Hy. Williams of Boston, Heyl of Philadelphia, and J. F. Noyes of Detroit.

The following papers were read and discussed:

"The Course and Prognosis of Malignant Orbital Tumors, as Influenced by Surgical Operations for their Removal." By Dr. C. S. Bull, New York.

Dr. Bull's conclusions were: "1. The prognosis of all forms of malignant orbital tumors, whether primary or secondary, is unfavorable; and if the tumor be primarily in one or more of the deep facial bones or their sinuses, the prognosis is positively bad. 2. Except in the case of encapsulated tumors of the orbit, surgical interference is almost invariably followed by a return of the tumor, and the growth of the secondary tumor is more rapid than that of the primary lesion. With each succeeding operation, the period of quiescence in the return of the tumor grows shorter, and the rapidity of the growth increases. 3. The patient's family, and in certain cases the patient himself, should in the beginning be told of the serious nature of the trouble and be warned that complete removal of all the diseased germs is a wellnigh hopeless task. The burden of the decision as to surgical interference must rest upon the shoulders of the patient. 4. Repeated operations in these cases undoubtedly shorten the life of the patient. While it is therefore our duty to operate in all cases, in order to relieve severe or unbearable pain, we should be slow to operate merely for the sake of relieving temporarily physical deformity, especially

if we are convinced that by so doing we shorten the life of the patient, even if that shortened life is rendered more bearable to the patient."

1. "Carcinoma of the Choroid (Metastatic)." 2. "Sarcoma of the Choroid." By HENRY D. NOYES, New York.

1. Woman aged 55, with a lesion in the region of the macula which had been pronounced a tumor. She refused enucleation and was kept under observation and palliative treatment for six months. During the early stages of the growth for about three months it was of limited extent, not exceeding two nerve diameters, measured about 6 D in thickness, ill defined, with a roughened, grayish spotted surface, through which black dots were faintly seen. Retina and choroid seemed adherent, but the infiltration evidently belonged especially to the choroid. Detachment of the retina began at the lower part of the eye and in six months became complete. Eye enucleated because of discomfort and inability to use the other one, which was normal.

History showed that there had been tumors removed from the breast, for the first time sixteen years before, for the second time seven years before, and a tumor is now present in the same gland. Three years ago had a tumor removed from the uterus.

Macroscopic examination of the eye showed total separation of the retina, thickening of the choroid reaching from the optic nerve nearly to the equator about 1.5 *mm* in thickness, and the tissue was shown by the microscope to be carcinoma. No extension outside of the globe, and the optic nerve not seriously invaded. The disease was clearly *metastatic* and for this reason the delay in removal of the eye was justified. The long period of sixteen years from the time when the first tumor was removed from the breast is noticeable. The eye disease is the product of infection and not a cause. Such cases are uncommon. None are recorded previous to 1872. Uhthoff summed up 14 in 1891 and added two more seen by himself. See his paper in *Internationale Beiträge zur wissenschaftliche Medicin*, Virchow's *Festschrift*. Three other cases have since been published, and the present brings the total up to twenty cases.

2. SARCOMA OF THE CHOROID.

Woman aged 50. With the exception of uterine trouble, previous history good. The first lesion of the eye was a broad band of hemorrhage reaching from near the optic disc to the equator just below the horizon. Eight months later a bleb of subretinal

effusion was seen in the ciliary region and near it a mesh of blood, vessels projecting into the vitreous. Seventeen months from the first occurrence of eye symptoms, vision was 0.4, and the detachment of the retina had increased and presented signs which awakened suspicion that under it a tumor might be concealed. Six months later a positive diagnosis of tumor was made and the eye enucleated. There had been no symptoms of tension nor acute inflammation. A tumor about 8 *mm* in diameter was found at the ciliary region, and proved to be a melano-sarcoma. Seven years later patient has been seen enjoying good health, with no return of the disease in the orbit, and with no symptoms of infection of other organs.

In view of the long exemption from manifestation of tokens of sarcomatous disease, attention is called to the article by Lawford and Treacher-Collins, *Royal London Ophthalmic Hospital Reports*, December, 1891, giving a summary of 103 cases of sarcoma of the uveal tract. A much better prognosis can be deduced from these cases than is derived by Fuchs from the study of the 253 cases compiled in his book, *Das Sarcoma des Uveal-Tractus*, 1882. Out of 79 whose after history is known they report 17 who had survived for periods between three years and nine and a quarter years, two survived sixteen years, and one survived eighteen years.

Prompt enucleation is of course to be insisted upon in cases of choroidal sarcoma, but there may be a considerable period of quietude for the eye while it is occupied by a tumor. The earlier the enucleation the more favorable the prognosis as to general infection, and since for at least a quarter of a century ophthalmic surgeons have acted upon this conviction, we now find, as shown by Lawford and Treacher-Collins, that the prognosis for general well-being has become more favorable.

Contrasting the two cases presented in this paper, we find that carcinoma is rare, while sarcoma is common ; that carcinoma is the result of infection, sarcoma usually primary and the cause of infection (a few cases of secondary sarcoma are recorded). In carcinoma the lesion is apt to be small, of little elevation, often begins at the region of the macula, seldom excites severe symptoms ; the large majority of the patients are women. In sarcoma the localization is more frequently eccentric from the macula, the tumor is apt to be massive, glaucomatous symptoms are likely at some period to arise, propagation upon the eyeball is not infre-

quent. Detachment of the retina is frequent in both carcinoma and sarcoma. Enucleation may be deferred with carcinoma until compelled by local symptoms—in sarcoma it should not be deferred. The rare cases of sarcoma at the macula can only be so diagnosticated by the absence of any history of previous or concurrent carcinoma. One case is given of carcinoma at the macula of each eye associated with sarcoma of the mediastinum (de Schweinitz and Meigs).

"A Case of Bilateral Necrosis of the Skin of Both Eyelids." By CHASE J. KIPP, M.D., Newark, N. J.

"W. N., white, forty-eight years of age, an habitual drunkard, while delirious walked out of a second-story window and fell on the brick pavement. On admission to the hospital it was found that he had simple fracture of left humerus and a simple comminuted fracture of left femur. With exception of a chronic catarrhal conjunctivitis, the lids and eyes were normal. Temp. 101. Two days after admission patient developed violent delirium. On third day, a small black spot was noticed in skin of upper lid near outer canthus of right eye, and twelve hours later a similar black spot appeared in skin of upper lid of left eye. Up to this time skin of eyelids had been entirely normal in appearance. On fourth day, the necrosis of skin had spread considerably, and black spots made their appearance on both lower lids. On the fifth day the necrosis had extended to the orbital margin in all directions on both sides. The lids were now so stiff that they could no longer be opened. On the sixth day a line of demarkation began forming, commencing below over the malar bone. The necrosis did not extend beyond the circumference of the orbit on either side. On the ninth day necrosed skin came away from upper lid of right eye, exposing the articular muscle. On the tenth day necrosed skin separated from left upper lid and both lower lids, exposing muscle. Examination of urine made at various times showed it to be free from albumen and sugar. Patient died on twelfth day after admission to hospital. *Autopsy* made twelve hours after death. Careful examination of brain failed to discover gross disease. Organs of chest and abdomen healthy. The lids were removed for microscopical examination, but were unfortunately lost."

The author has been unable to find similar cases on record.

Bilateral gangrene or necrosis of lids is, according to Himly, sometimes seen shortly before death in severe cases of typhus

fever. He regards it as a form of erysipelas limited to the skin of the eyelids.

Mitvalsky (*Zehnder's Monatsblätter*, January, 1893) has described two cases somewhat similar to the above.

Elschnig (*Zehnder's Monatsblätter*, January, 1893) thinks that idiopathic gangrene or necrosis of the skin of the lids has not yet been observed, and that in the reported cases the gangrene of the skin of the lids presented only a symptom or a peculiar ending of an inflammatory process originally located in either the skin or the subcutaneous tissue. Kipp regards his case as one of idiopathic necrosis of the skin of the lid.

"Case of Extraction of a Piece of Copper from the Vitreous, in which X-Rays Helped to Locate the Metal." By C. H. WILLIAMS, Boston.

"A piece of the copper shell from an exploding cartridge struck the eye, wounding cornea and lens. No view could be had of the interior of the eye. An X-ray radiograph was obtained by my brother, Dr. Francis H. Williams, with a Wimshurst machine. By placing the patient on a table with the left cheek resting on a plate-holder and the Crookes' tube about eight inches from the head, an exposure of ten minutes was made. The orbital bones cut off some of the rays, but enough reached the plate to give a distinct picture of a foreign body in the eye. An operation was done through the sclera between the external and inferior recti muscles, and a piece of thin copper one quarter of an inch long by one eighth of an inch wide was extracted from the posterior portion of the vitreous. The eye healed well, and no anodyne was required. At the end of about five weeks the same eye was struck by a piece of iron wire, became irritable, and was removed."

*Discussion.*

Dr. H. Knapp, of New York, fully endorsed the prognosis given except as it related to tumors of the optic nerve and of the lachrymal gland. He stated that the latter were not primarily very malignant and that no relapse may occur for many years.

Dr. Gruening, of New York, endorsed this opinion.

Cases were reported by Dr. C. J. Kipp, of Newark, and Dr. W. B. Johnson, of Paterson, in which long periods had elapsed before any recurrence of the tumor.

"Tumor of the Optic Nerve in a Child Aged Three Years and a Half." By Dr. S. D. RISLEY, Philadelphia.

"Mary B., aged three years, small, badly nourished child, brought to the hospital because of swelling of right eyelids which began three years before. Lids were œdematous and discolored and together with the dropsical conjunctiva completely concealed the cornea. The conjunctiva had to be incised twice and hot compresses used for several days before satisfactory study of the cornea could be made. This tissue was found steamy, the ball hard, pupil large, and a yellowish reflex from the interior of the eye was visible. It was regarded as malignant intra-ocular growth and enucleation advised. After two days in the hospital the hardness of the ball, œdema, chemosis, and exophthalmus had so far disappeared that operation was deferred and in two weeks the child sent to its home, but kept under observation at the clinic. In two weeks the increased tension returned and the lens was pressed forward into the anterior chamber. The ball was then enucleated. The optic nerve was lost in a neoplasm which filled the apex of the orbit and closely invested the posterior surface of the globe. The ball and tumor were preserved in formalin and on subsequent section the latter was found to be a glio-sarcoma, which had apparently begun in the optic nerve, and penetrated the ball, filling the posterior two-thirds. The choroid had entirely disappeared."

"A Case of Multiple Osteo-Sarcoma of the Supra-Orbital Margin and Other Parts of the Skull." By Dr. H. KNAPP, New York.

"The patient, a man of sixty-three years, had been ailing and weak for months; not long since he broke his right thigh bone, without any injury. Two months ago a swelling appeared at the outer half of the brow, accompanied by protrusion of the eye forward and downward, and stupor. The swelling was about 2.5 *cm* in diameter, the border presenting a hard ridge continuous with the surrounding bone, the centre slightly depressed and of fleshy softness. Below the superior orbital margin there was a tumor of tendinous hardness under the periosteum, extending backwards into the orbit, its posterior limit not reached on palpation. Movements of the eye good. My opinion was a periosteal sarcoma with osseous spiculæ, and I advised an exploratory incision. Prognosis bad. The patient, however, sank rapidly and died four days later. At the autopsy it was found that the supra-orbital tumor

had pierced the frontal bone above the brow and rested as a spherical, soft, uneven mass the size of a walnut, on the horizontal plate, which it had also pierced and rested on the periosteum beneath. It also extended through the superior orbital fissure into the middle cranial fossa. Independent of this tumor in the middle part of the skull, there was another larger one, of the same kind, springing from the lateral portion of the posterior surface of the petrous bone, involving in its growth the adjacent part of the cerebellum. Still another similar mass was found to have corroded the right parietal bone near the vertex. Microscopically all these tumors exhibited the uniform picture of a large round-celled sarcoma."

"A Case of Tuberculosis of the Conjunctiva, Probably Primary, Followed by General Infection and Death." By Dr. F. E. CHENEY, Boston.

The primary lesion appeared on the conjunctival surface of the left upper lid and presented the typical appearances. Tubercle bacilli were found on microscopic examination. The glands in front of the ear were affected when first seen. Frequent examination of the chest failed to elicit any trouble in the lungs. The child was under observation nearly three years. It disappeared from the clinic on May 26th and on July 4th died of general tuberculosis. The main trouble just preceding her death seemed to be with the throat.

"A Case of Peculiar Congenital Growth [Osteo-Lipoma] at the Inner Canthus." By Dr. A. A. HUBBELL, Buffalo.

"The patient was a child of three months and was born with a growth on the right eye. The growth was round, semi-solid, non-fluctuating, and was covered with normal skin. It was about three fourths of an inch in diameter and had a large pedicle by which it was attached to the inner extremity of the upper lid. It supplanted the caruncle and was adherent to the inner and lower part of the eyeball, its covering extending nearly to the centre of the cornea. On the eyeball this dermal covering was so changed as to resemble mucous membrane, but was opaque and whitish in color. The lower punctum and lachrymal canal were absent. During the operation of removal it was found that the pedicle contained bone which extended backward into the orbit and seemed to be attached to its inner wall. It was completely removed and the examination showed that the principal mass was entirely adipose tissue covered with skin. The bone portion was

three quarters of an inch long and one eighth of an inch in diameter. I have not been able to find anything like it recorded."

"Diphtheritic Conjunctivitis." By Dr. MYLES STANDISH, Boston.

Dr. Standish reported a number of cases of membranous conjunctivitis which had been examined bacteriologically, and it was a peculiar feature that some which presented the clinical picture of diphtheria were free from the characteristic organism of that disease, while others which appeared only croupous in character were found to present the Klebs-Loeffler bacillus. Some cases were due to the staphylococcus or the streptococcus and others were of mixed infection. Dr. Standish thought such examinations would call for a readjustment of our nomenclature on bacteriologic principles.

"Notes on Keratitis Punctata Superficialis." By Dr. B. ALEX. RANDALL, Philadelphia.

Dr. Randall reported a peculiar and persistent case. "The patient came with a watering, painful eye which had been so since a slight blow received three weeks before. The condition was growing worse and sight was impaired. Only one eye was affected and it showed marked conjunctival and circumcorneal injection. The iris was affected at no time. The cornea showed superficial infiltration at the outer lower margin. The surface was nowhere abraded, but was marked by nearly uniform pin-point elevations over the whole affected area. These points were not arranged in the usual triangular form, though they resembled those of Descemetitis. The case has not improved under any treatment and now has an appearance suggestive of coming ulceration. There is no malarial, syphilitic, or other taint."

"Three Cases of Membrana Pupillaris Perseverans, in which there is a Firm Attachment to the Lens Capsule with Opacity of this Membrane, and of a Thin Layer of Underlying Lens Substance." By Dr. W. F. NORRIS, Philadelphia.

"Of the four cases reported two were situated at the upper-outer quadrant, one at the inner, and one in the lower-outer. In no case did the attachment to the capsule extend as far as the anterior pole of the lens. In two cases the pyramidal bands of persistent pupillary membrane were broad, of the same color as the iris itself—becoming gray only close to their insertion in the capsule, in one they were grayish with a slight tinge of brown pigment, and in one they were thin brownish shreds running to a very

faint capsular spot. In two cases the bands were inserted so far in the periphery of the anterior surface of the iris that they in no wise interfered with the contraction and dilatation of the pupil, while in two some of the bands were inserted into the smaller circle of the iris and prevented full dilatation of the pupil at that point. The eyes were all hypermetropic-astigmatic, two of them in a high degree. In one there was an apparently congenital patch of choroiditis. The fundus in the other three presented no abnormalities. The lens was in every instance transparent except at or near the point of capsular attachment, where there was slight proliferation of the anterior epithelium. The points of attachment apparently corresponded with the position of the tips of the vascular loops which in the fœtus ramify in the anterior pupillary membrane."

*Discussion.*

Dr. F. W. Abbott, of Buffalo, reported a case of persistent membrane in which seven fine shreds, as delicate as silk, extended from a small spot near the anterior pole of the lens to the iris, where they were attached about midway between the edge of the iris and its circumference.

"Rupture of the Iris at the Pupillary Margin and in Continuity, from Contusion of the Eyeball." By Dr. G. C. HARLAN, Philadelphia.

Dr. Harlan reported eight cases, of which six were instances of pupillary rupture and two of radiating ruptures in the continuity of the iris. In all the cases of rupture beyond the sphincter the tear has been across the direction of the radiating fibres, which have caused the wound to open out and form a rounded perforation somewhat like an additional pupil.

"The Use of Mercury in Traumatic Irido-Choroiditis." By Dr. C. W. KOLLOCK, Charleston, S. C.

Dr. Kollock believes in the use of mercurial inunctions in such cases, and reports several to show its beneficial action.

*Discussion.*

Dr. Myles Standish, of Boston, reported two cases of sympathetic ophthalmia, which recovered with vision of 1. In both cases the recovery was attributed to the inunctions of mercury.

"A Case of Double Choked Disk, Caused by a Cystic Tumor

Involving the Right Frontal Lobe of the Brain, with Autopsy." By Dr. H. F. HANSELL, Philadelphia.

"The patient was a stout, healthy, young girl. Family history irrelevant. She complained of frequent severe headaches, dating from exposure to the sun during the preceding summer. The R E V = P. L.; L E V = $\frac{1}{2}$. Disks enormously swollen. The case was under observation for three years. She became totally blind before death. At the autopsy a large cystic cavity was found in the right frontal lobe, and a quantity of fluid escaped through the ventricles which were in communication with the cyst."

"Some Bacteriological Experiments Bearing upon the Sterilization of Instruments Used in Cataract Extraction." By Dr. S. THEOBALD, Baltimore.

After a series of very careful experiments, Dr. Theobald concludes "that bacteria are not removed by simple washing, even from the smooth surface of a cataract knife, but, so far as the ordinary pyogenic organisms are concerned, a very brief washing in boiling water, which is not likely to appreciably blunt their cutting edges, suffices to sterilize effectually such instruments as are commonly used in eye surgery."

"Embolism of the Central Artery; Retino-Ciliary Artery Supplying the Macula; Preservation of Central Vision." By Dr. O. F. WADSWORTH, Boston.

"In 1890 I reported a case of plugging of the central artery of the retina, in which the macular region was supplied by a retino-ciliary artery and central vision preserved. The case presented to-day offers a striking similarity in its essential features. There was the sudden onset and marked permanent concentric contraction of the field, with retention of good central vision; the white haze involving disk and retina for a long distance, but leaving the macular region, the space between it and the disk, free. The first case was considered as one of thrombus, because no lesion of the heart or great vessels was discovered. In the second, a lesion of the aortic valve gave opportunity for the formation of an embolus."

*Discussion.*

Dr. W. F. Mittendorf, New York, reported three cases of this kind, where complete blindness was prevented by the central ciliary artery.

"Two Cases of a Rare and Generally Fatal Disease of Degeneration in Infancy, Associated with Early Blindness and Characteristic Retinal Changes." By Dr. CARL KOLLER, New York.

"Only nineteen cases, including these two, have been reported, and in reading the histories of all one is struck by their uniformity. The children are born of healthy parents with no history of syphilis; most of them, if not all, are Jews. Up to the third or fifth month of age the children develop well; nothing unusual is noted, unless a former case in the same family directs the attention to the ocular symptoms, which, in fact, seem to precede the others. Between the third and eighth month, sometimes sooner, a peculiar weakness of the muscles shows itself; the children are unable to hold their heads up, the back is weak, the muscles flabby, the reflexes present. The further development is retrograde, both as to body and mind. They do not learn to walk, present the picture of idiocy, and fall into a condition of marasmus, to which they succumb at the age of about two years. The eye symptoms, although not always first noticed, seem to appear in the first weeks or months of the child's life. It is not likely that the retinal changes are congenital, as some observers have said. The ophthalmoscopic picture is of striking uniformity, and, according to all observers, very similar to the changes found in embolism of the central artery. The yellow-spot region is the site of a whitish opacity, the centre of which shows a cherry-red spot. The disks are yellowish or grayish, but otherwise look normal and well defined; later on atrophy develops. In some cases there is nystagmus. The affection is a family disease, the nineteen cases reported having occurred in ten families. So far only three autopsies have been held. They revealed changes in the layer of the large pyramidal cells in the cortex of the brain, presumably due to arrested development. One observer found descending degeneration in the cervical part of the cord. No examination of the eyes has been made." Dr. Koller then gives in detail his two cases, and concludes "that the anatomical substratum of the affection is most likely a degenerative process in the cortex of the brain and in the retina. From the clinical course of the disease, the original healthy condition of the child, the consequent development of the marasmus, and the characteristic changes in the eyes, we must conclude that we have to deal less with a condition of arrested development than with a progressive morbid process in the nervous system."

*Discussion.*

Dr. Knapp had seen three cases, all in Hebrews. Since he met with the first case, he examined under homatropia the macula in every child brought for nerve trouble or defective sight, but in all, except the above three, the lesion under consideration was absent.

"Angioid Streaks in the Retina." By Dr. G. E. DE SCHWEINITZ, Philadelphia.

Dr. De Schweinitz reported a case showing the characteristic appearances of these streaks and remarks that "the interesting point in connection with these sketches is that they demonstrate, from the ophthalmoscopic standpoint at least, the undoubted hemorrhagic nature of the lesion, which may be traced from their origin in the hemorrhagic metamorphosis through the stage in which the formed striæ, still partly hemorrhagic in nature, are disposed in characteristic and branching lines, to their later development into true pigment streaks and ridges." Dr. De Schweinitz made a careful examination of this patient's blood and found that the retinal hemorrhages were probably not the result of any general blood dyscrasia.

*Discussion.*

Dr. Knapp (who gave this name of angioid streaks to the condition described) presented some pictures of its characteristic appearances and said that he had noticed their direct connection with a hemorrhage and had in fact practically observed the gradual development of the streaks while the hemorrhage was undergoing absorption and alteration.

"The Management of Glaucoma." By Dr. S. O. RICHEY, Washington.

"I may state that I have never seen a case of glaucoma acute or chronic that did not have a history of gout, inherited or acquired, or show sooner or later the ordinary symptoms or developments of gout, except a few cases caused by syphilis, the cause in such cases being clearly indicated by the history." After considering the conditions which produce, or exist, with a glaucomatous attack, Dr. Richey dwells on the internal treatment with careful attention to the diet and condition of the intestinal tract, and use of eserine with taxis, believing that this will often obviate an iridectomy.

The paper on "Iritis Dependent on Chronic Cystitis," by Dr. Jos. A. ANDREWS, related especially to a case of iritis occurring in a man aged thirty-nine years. The man had married at the age of twenty-one years. He acknowledged that he had had gonorrhœa when nineteen years old, but had not had the disease since that time. It was not a severe attack. Had not had rheumatism nor syphilis. There was a urethral stricture and enlarged prostate. Urine was very fetid and of ammoniacal odor. Patient was not of robust health, but great pains had been taken to exclude as far as possible every other cause for the iritis than that of the disease of the bladder. Kidneys were healthy as far as could be made out by examination of urine. There had been two attacks of iritis occurring at different times. A large amount of lymph was thrown out into anterior chamber, which disappeared promptly under mercurial inunction, but the iritis did not show a disposition to get well until the bladder trouble improved.

"The case of Tubercle of Iris," seen by Dr. Jos. A. ANDREWS, "occurred in a girl aged seventeen years. When first seen in consultation, syphilis and sarcoma were excluded, and as there were no signs of infection of any other part of the body, I recommended enucleation of the eyeball. To this the parents would not consent, and the advice of another oculist was sought, who expressed the opinion that the growth in the iris was most likely a simple inflammatory exudation, and advised that the trouble be treated as such. Six weeks later patient showed signs of meningitis, and then the eye was enucleated, with what object in view I cannot surmise. The patient died and the family physician stated that tubercular meningitis was the cause of death. It is not maintained that this was a case of primary tubercle of the iris, although such appears to have been the case."

The following is a list of the other papers read before the society. They could not be used for the above report as the MSS. have not yet been received:

"Primary Sarcoma of the Iris." Dr. J. A. Andrews.

"Exostosis and Hyperostosis of the Orbit." Dr. R. Sattler.

"A Microscopic Study of the Blood-Vessels of the Retina and Choroid Illustrated by Micro-Photographs." Dr. Jas. Wallace.

"A Case of Sympathetic Irido-Cyclitis." Dr. B. L. Millikin.

"Absolute Alcohol as a Disinfectant for Cutting Instruments." Dr. R. L. Randolph.

"An Unusual Case of Glaucoma." Dr. B. L. Millikin.

"The Pupil in Absolute Blindness." Dr. Geo. C. Harlan.

"The Presence and Location of a Minute Filament of Steel in the Eye Determined by the Roentgen Rays and Successfully Removed by Electro-Magnet." Dr. F. Clarke.

"Binocular Lenses for the Examination of the Eye by Oblique Illumination." Dr. E. Jackson.

"Amblyopia in Reading." Dr. Carl Koller.

"Treatment of Dermoid Cysts of the Orbit." Dr. F. Buller.

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## BOOK REVIEWS.

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**The Toxic Amblyopias:** their Classification, History, Symptoms, Pathology, and Treatment. The essay awarded the Alvarenga Prize of the College of Physicians of Philadelphia, 1894. By G. E. DE SCHWEINITZ, A.M., M.D. Pp. 238, with forty-six illustrations and nine plates. Philadelphia: Lea Brothers & Co., 1896.

This book is a full exposition of our present knowledge of the toxic amblyopias, written in a style that makes it easy continuous reading, while its completeness renders it particularly valuable as a work of reference. The amblyopias caused by tobacco, alcohol, quinine, lead, bisulphide of carbon, nitrobenzol, male fern, and the like, are treated of in turn according to a scientific classification, and in the case of each, the symptoms of systemic poisoning, the visual disturbances, the mode of entry of the poison, the pathology, prognosis, and treatment are taken up, and abstracts of a number of case-histories are added, and full references to the literature are given.

There are some more or less well authenticated cases recorded in the literature, in which visual disturbances have been attributed to the action of a certain drug, and in such doubtful cases abstracts of the reports are given, so that the reader may himself judge of the probability of the amblyopia being really due to the drug or to the affection for which the drug was given, or of its merely following the use of the drug without being caused by it.

A valuable point that is emphasized is the possibility that a toxic amblyopia may be complicated by or confounded with hysterical amblyopia, particularly in lead poisoning, in which

hysterical affections are said to occur. The symptoms revealing the hysterical factor are a reversal of the usual sequence of the color fields and the existence of areas of cutaneous anæsthesia.

In the course of the preparation of this work the author has made numerous experiments on animals, the most successful of which, the production of quinine blindness in dogs, have been previously reported, and are well known.

As a complete and authoritative treatise on the toxic amblyopias this book will not soon be superseded. W. A. H.

**The Fundus Oculi,** with an Ophthalmoscopic Atlas illustrating its Physiological and Pathological Conditions. By W. ADAMS FROST, F.R.C.S. Macmillan & Co.

Dr. Frost has succeeded in producing a comparatively low-priced ophthalmoscopic atlas which will be very serviceable to the general practitioner, for whom it is especially intended, and hardly less so to the professed ophthalmologist. It contains 107 colored drawings illustrating nearly all of the physiological and pathological appearances of any importance met with in the fundus. With very few exceptions, these are taken from Dr. Frost's own cases, and their value for the reader is considerably enhanced by the feeling that the author has himself observed the appearances depicted, and is thus able to certify to the correctness of the representation. The descriptive and clinical notes appended to each plate, apart from their intrinsic value, tend to heighten this feeling of certitude. Moreover, the artist has evidently done his part faithfully, the drawings giving an accurate and vivid idea of the appearances met with in actual practice.

In the letterpress of 219 quarto pages preceding the plates, the anatomy and normal appearances of the fundus, together with the more ordinary pathological changes, are described with considerable fulness. This part is well brought up to date, and is rendered more useful by the insertion of forty-six illustrations in black and white.

In general, the book covers the ground of ophthalmoscopy with satisfactory completeness. We could, however, have wished that the author had devoted a little more space and some additional plates to one or two conditions which have received but scant attention. Among these are tuberculosis of the choroid, tumors of the choroid, and retinitis proliferans.

The typography and the entire mechanical execution of the book are of the highest order. A. D.

## MISCELLANEOUS NOTES.

### APPOINTMENTS.

Prof. FÖRSTER resigned his position at the University of Breslau, which he held so honorable for many years. Prof. W. UHTHOFF of Marburg has been appointed his successor, and Prof. Extraord. C. HESS of Leipzig has been appointed Professor Ordinarius to succeed Prof. Uhthoff.

Dr. AUG. DUFOUR has been appointed Lecturer at the Faculty of Medicine in Lausanne, Switzerland.

## Obituary.

On January 27, 1896, Professor RUDOLPH SCHIRMER of Greifswald, the founder and for many years head of the university ophthalmic clinic, died at the age of sixty-five years. He contributed a number of valuable papers to ophthalmology, and was the author of the chapter on Lachrymal Diseases in Graefe-Saemisch's handbook. His son, Otto Schirmer, has been appointed as his successor.

**Contents of the last number of the Archiv für Augenheilkunde** (German edition of these ARCHIVES).

Vol. XXXII., Nos. 3 and 4.

*A.*—ORIGINALS.

L. BACH. Tuberculosis of the Cornea.

H. WINTERSTEINER. Corneal Changes in Neuro-Epithelioma (Glioma) of the Retina.

A. PETERS. Relations between the Disturbances of Orientation in Monolateral and Bilateral Hemianopia.

J. WELTER. Case of Retinitis Circinata.

N. SCHTSCHEPOTJEW. Epidemic Hemeralopia.

HILLEMANS. Injuries of the Eye—II.

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W. N. DOLGALOFF. Retinal Changes in Infective Disease.

H. KNAPP. Cavernous Angioma of the Orbit (published before in English edition).

L. BACH. Genesis of Congenital Colobomas of the Eyeball.

E. ERGER. Historical Remarks on the Anatomy of the Ora Serrata Retinæ.

L. CASPER. Case of One-Sided Reflex Rigidity of the Pupil.

ED. BERGENS. On Adenoma of the Ciliary Body as Cause of Glaucoma.

F. WERTHER. Sarcoma of the Iris.

*B.*—REPORT ON THE PROGRESS OF OPHTHALMOLOGY DURING THE FOURTH QUARTER, 1895. (Translated in this number.)

*C.*—MISCELLANEOUS NOTES.

# ARCHIVES OF OPHTHALMOLOGY

## NOTICE TO OUR READERS.

The ARCHIVES OF OPHTHALMOLOGY contain *original papers* on all branches of ophthalmic surgery, and *original reports* on the progress of ophthalmology. The original papers occupy from two thirds to three fourths of the space, and their scope embraces all subjects of scientific and practical interest connected with this department of medicine.

The object of the ARCHIVES is to guard, solidify, extend, and diffuse the stock of acquired ophthalmic knowledge by recording the constant addition of new observations, investigations, methods and means of examination, clinical experience, instruments and remedies, and further by taking part in the discussion of the questions of the day with a spirit alike conservative and progressive.

Particular attention is paid to the preparation of the Report on the Progress of Ophthalmology. The report is intended to furnish a *complete, systematic, and early* review of the current ophthalmological literature of the world. It has been necessary to divide the work of its preparation among a number of collaborators according to the following arrangement:

Dr. ST. BERNHEIMER, of Vienna.

1. *General Ophthalmological Literature:*
   *a.*—Text-books (not abstracts, but notes pointing out what is new and characteristic).
   *b.*—Monographs and papers on historical, statistical, and general subjects; reports on societies and hospitals.
   *c.*—Periodicals on our specialty (short notices of their character, time and place of publication, the titles of the original papers, with the names of their authors).

2. *General Pathology, Diagnosis, and Therapeutics*, including new instruments, apparatus, and remedies.
3. *Normal Anatomy and Physiology*, including color-blindness.

Dr. C. HORSTMANN, Prof. at the University of Berlin (Potsdamer Strasse 4):

1. *Anomalies of Refraction and Accommodation.*
2. *Eyelids.*
3. *Lachrymal Apparatus.*
4. *Muscles and Nerves.*
5. *Orbit and Adjacent Cavities.*
6. *Conjunctiva, Cornea, Sclerotic.*
7. *Injuries and Foreign Bodies of these parts.*

Dr. P. SILEX, Lecturer at the University of Berlin.

1. *Uveal Tract*, including glaucoma.
2. *Refracting Media*, including the lens.
3. *Retina and Optic Nerve.*
4. *Injuries and Foreign Bodies of these parts.*
5. *Ocular affections in connection with general diseases.*

In order to obtain complete and recent reviews on the non-German ophthalmological literature, special reporters have been selected for different countries, who will send monthly abstracts of all local ophthalmological publications to Dr. C. Horstmann, of Berlin, the editor of the Report. Dr. Horstmann will distribute these abstracts among the German reporters according to the above plan, in order to preserve the systematic arrangement which we think of paramount importance.

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*For France and Belgium:* Drs. D. E. SULZER, Geneva, and P. VON MITTELSTÄDT, Metz.

*For Germany:* Drs. BERNHEIMER, Vienna, HORSTMANN, SILEX, and DEUS, in Berlin.

*For Italy:* Dr. DANTONE, Rome.

*For Russia:* Prof. HIRSCHMANN, Charkow.

*For Scandinavia:* Drs. OLE BULL and SCHIÖTZ, Christiania.

*For Holland:* Dr. C. A. H. WESTHOFF, of Amsterdam.

**In the interest of our readers, who are scattered over the whole world—and whom, like ourselves, we desire to keep informed of all advances in ophthalmology,—furthermore in their own interest, authors of ophthalmological works are requested to send reprints, duplicates of journals, or copies for reviewing, to one of the above-named reporters, or to the editors or publishers of the Archives, according to their convenience.**

The abstracts of American ophthalmological literature formerly appeared under a special head, but are now embodied in the systematic Report. Text-books may be specially noticed.

The number of good papers offered us for publication has increased to such an extent that it is no longer possible to translate all of them unabridged. Whenever a German paper is condensed in the English version, or *vice versa*, it will be so stated. Should any one of our readers wish to recur to the original, the editors will always take pleasure in sending it for reference.

Under the heading of "Miscellaneous Notes," there will be published all kinds of professional news which specially concern the oculist, *e. g.*, appointments, honors, resignations, vacancies, new ophthalmic hospitals, opportunities for instruction, prize questions and essays, announcement of Society meetings, etc. Brief notices of this kind will be thankfully received by the editors.

Original papers of value from any source will, as heretofore, be welcome to the ARCHIVES, and are solicited.

*EDITORS:*

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## NOTICE TO CONTRIBUTORS.

The editors and publishers of the ARCHIVES beg to offer some suggestions to authors who propose to favor them with their contributions.

1. As original communications the ARCHIVES can accept only such papers as have never been printed nor are intended to be printed in other journals. If a preliminary communication on the subject of a paper has been published, the author is requested to state this in the letter accompanying his manuscript. It is understood that contributors to these ARCHIVES and editors of other periodicals will make no abstracts of the original papers published in this journal without giving it due credit for the same.

2. Authors will receive gratuitously twenty-five reprints of their articles. If a greater number is desired,—notice of which should be given at the head of the manuscript,—only the additional cost of presswork and paper will be charged to the author.

3. In preparing manuscript for the compositor it is requested that the following rules be adhered to:

*a.* Write on one side of the paper only.

*b.* Write without breaks, *i. e.* do not begin a new sentence on a new line. When you want to begin a new line or paragraph at a given word, place before it in your MS. the sign ¶.

*c.* Draw a line along the margin of such paragraphs as should be printed in smaller type—for instance, all that is clinical history in reports of cases, etc.

*d.* Words to be printed in *italics*, should be underscored once, in SMALL CAPITALS twice, in LARGE CAPITALS three times.

4. Authors may receive proofs for revision if they will kindly return them without delay. We beg however to remind our contributors that changes in the copy are equivalent to resetting, causing so much additional expense. We therefore request them, to make, if possible, no alterations at all in their MSS., or, at least, to limit these to what is of essential importance.

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